

FC-1-C1-PUS.ST25_April2002.txt
SEQUENCE LISTING

<110> Silver, Gary M.
Brandt, Kevin S.
Wisniewski, Nancy

<120> NOVEL CARBOXYLESTERASE NUCLEIC ACID MOLECULES, PROTEINS AND USES THE
REOF

<130> FC-1-C1-PUS

<140> 09/403,942
<141> 2000-05-02

<150> PCT/US97/20598
<151> 1997-11-10

<150> 08/747,221
<151> 1996-11-12

<160> 76

<170> PatentIn version 3.1

<210> 1
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<212> DNA
<213> Ctenocephalides felis

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<223> At nucleotide 219, n = unknown
At amino acid residue 43, Xaa = Ile, Thr, Lys or Arg

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<222> (275)..(275)
<223> At nucleotide 275, n = unknown
At amino acid residue 62, Xaa = Gln, Glu or Lys

<220>
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<222> (329)..(329)
<223> At nucleotide 329, n = unknown
At amino acid residue 80, Xaa = Gln, Glu or Lys

<220>
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<222> (332)..(332)
<223> At nucleotide 332, n = unknown
At amino acid residue 81, Xaa = Tyr, His, Asn or Asp

<220>

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 <222> (352)..(352)
 <223> At nucleotide 352, n = unknown

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tgagagtgtt ggatttgtga aatatttcaa a atg aat tct tta att gta aaa      112
                               Met Asn Ser Leu Ile Val Lys
                               1               5

att tct caa gga gct att gag ggg aag gaa atg att aat gat aat gga      160
Ile Ser Gln Gly Ala Ile Glu Gly Lys Glu Met Ile Asn Asp Asn Gly
          10               15               20

aag tcg ttt aga gga ttt ttg ggt ata cct tat gct aaa ccg cct ata      208
Lys Ser Phe Arg Gly Phe Leu Gly Ile Pro Tyr Ala Lys Pro Pro Ile
          25               30               35

gga aat ctt ana ttt aag cct cct caa aag cct gat gat tgg aat gat      256
Gly Asn Leu Xaa Phe Lys Pro Pro Gln Lys Pro Asp Asp Trp Asn Asp
          40               45               50               55

gtt cga cca gct act gaa naa gca aat ggt tgt aga tcg aaa cat atg      304
Val Arg Pro Ala Thr Glu Xaa Ala Asn Gly Cys Arg Ser Lys His Met
          60               65               70

ctg cag cat cat att att gga gac naa nat tgt cta tac cta aac gtn      352
Leu Gln His His Ile Ile Gly Asp Xaa Xaa Cys Leu Tyr Leu Asn Val
          75               80               85

tat gtt cca ttg act tcc aaa ttg gag aaa cta cca gta atg ttc tgg g      401
Tyr Val Pro Leu Thr Ser Lys Leu Glu Lys Leu Pro Val Met Phe Trp
          90               95               100
    
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<210> 2
 <211> 103
 <212> PRT
 <213> Ctenocephalides felis

<220>
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 <222> (43)..(43)
 <223> The 'Xaa' at location 43 stands for Lys, Arg, Thr, or Ile.

<220>
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 <222> (62)..(62)
 <223> The 'Xaa' at location 62 stands for Lys, Glu, Gln.

<220>
 <221> misc_feature
 <222> (80)..(80)
 <223> The 'Xaa' at location 80 stands for Lys, Glu, Gln.

<220>
 <221> misc_feature
 <222> (81)..(81)
 <223> The 'Xaa' at location 81 stands for Asn, Asp, His, or Tyr.

<400> 2

Met Asn Ser Leu Ile Val Lys Ile Ser Gln Gly Ala Ile Glu Gly Lys
1 5 10 15

Glu Met Ile Asn Asp Asn Gly Lys Ser Phe Arg Gly Phe Leu Gly Ile
20 25 30

Pro Tyr Ala Lys Pro Pro Ile Gly Asn Leu Xaa Phe Lys Pro Pro Gln
35 40 45

Lys Pro Asp Asp Trp Asn Asp Val Arg Pro Ala Thr Glu Xaa Ala Asn
50 55 60

Gly Cys Arg Ser Lys His Met Leu Gln His His Ile Ile Gly Asp Xaa
65 70 75 80

Xaa Cys Leu Tyr Leu Asn Val Tyr Val Pro Leu Thr Ser Lys Leu Glu
85 90 95

Lys Leu Pro Val Met Phe Trp
100

<210> 3
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<213> Ctenocephalides felis

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<400> 3

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ttgcttnttc agtagctggt cgaacatcat tccaatcatc aggcttttga ggaggcttaa      180
atntaagatt tcctataggc ggttttagcat aaggtatacc caaaaatcct ctaaacgact      240
ttccattatc attaatcatt tccttcccct caatagctcc ttgagaaatt tttacaatta      300
aagaattcat tttgaaatat ttcacaaatc caacactctc actaataaac ttgatcttga      360
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<210> 4
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1 5 10 15

ata aac tgt gat tcc ccg act gta act ttg ccc caa ggc gaa ttg gtt      97
Ile Asn Cys Asp Ser Pro Thr Val Thr Leu Pro Gln Gly Glu Leu Val
20 25 30

gga aaa gct ttg acg aac gaa aat gga aaa gag tat ttt agc tac aca      145
Gly Lys Ala Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr Thr
35 40 45

ggt gta cct tat gct aaa cct cct gtt gga gaa ctt aga ttt aag cct      193
Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Pro
50 55 60

cca cag aaa gct gag cca tgg caa ggt gtt ttc aac gcc aca tta tac      241
Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn Ala Thr Leu Tyr
65 70 75 80

gga aat gtg tgt aaa tct tta aat ttc ttc ttg aag aaa att gaa gga      289
Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu Lys Lys Ile Glu Gly
85 90 95

gac gaa gac tgc ttg gta gta aac gtg tac gca cca aaa aca act tct      337
Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro Lys Thr Thr Ser
100 105 110

gat aaa aaa ctt cca gta ttt ttc tgg      364
Asp Lys Lys Leu Pro Val Phe Phe Trp
115 120

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<210> 5
 <211> 121
 <212> PRT
 <213> Ctenocephalides felis

<400> 5

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 1 5 10 15

Ile Asn Cys Asp Ser Pro Thr Val Thr Leu Pro Gln Gly Glu Leu Val
 20 25 30

Gly Lys Ala Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr Thr
 35 40 45

Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Pro
 50 55 60

Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn Ala Thr Leu Tyr
 65 70 75 80

Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu Lys Lys Ile Glu Gly
 85 90 95

Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro Lys Thr Thr Ser
 100 105 110

Asp Lys Lys Leu Pro Val Phe Phe Trp
 115 120

<210> 6

<211> 364

<212> DNA

<213> Ctenocephalides felis

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 tccgtataat gtggcggtga aaacaccttg ccatggctca gctttctgtg gaggcttaaa 180
 tctaagttct ccaacaggag gtttagcata aggtacacct gtgtagctaa aatactcttt 240
 tccattttcg ttcgtcaaag cttttccaac caattcgcct tggggcaaag ttacagtcgg 300
 ggaatcacag tttataaaat taaaactaaa caaaaaata caacttaaaa aaataacacg 360
 agac 364

<210> 7

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<210>      8
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<212>      PRT
<213>  Ctenocephalides felis
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<400> 8

Page 6

Asp Cys Leu Tyr Leu Asn Val Tyr Val Pro Lys Thr Ser Glu Lys Ser
85 90 95

Leu Leu Pro Val Met Val Trp
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<210> 9
<211> 421
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<213> Ctenocephalides felis

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cccttcttta gtagcatcaa ggacacctga ccaagggttct gcagggttgag gtggcttgaa 180
tcttagatca ccaactggag gtttggcata tggaattcca gaataactat aaaacacatt 240
tcccttttca ttaatttgct cttttcctct caaagaacct tgtaacaaag tcacttgaag 300
atcacccatt gtaaaggaaa atctcaggta aaataaatta atcacagtct aaagtccata 360
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a 421

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gataaataat aacaattaag caaccaaatt gcattaaaaa acacaataaa aa atg tta 118
Met Leu
1
cct cac agt agt gca tta gtt tta ttt tta ttt ttt tta ttt ttc tta 166
Pro His Ser Ser Ala Leu Val Leu Phe Leu Phe Phe Leu Phe Phe Leu
5 10 15
ttt aca cct atc ttg tgc ata cta tgg gat aac cta gat cag cat ttg 214
Phe Thr Pro Ile Leu Cys Ile Leu Trp Asp Asn Leu Asp Gln His Leu
20 25 30
tgc aga gtt caa ttt aac agg atc acg gaa gga aaa ccg ttc cga tat 262
Cys Arg Val Gln Phe Asn Arg Ile Thr Glu Gly Lys Pro Phe Arg Tyr
35 40 45 50
aaa gat cat agg aat gat gta tat tgt tct tat ttg gga att cct tat 310

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Lys Asp His Arg Asn Asp Val Tyr Cys Ser Tyr Leu Gly Ile Pro Tyr
55 60 65

gcc gaa ccg cct att gga cca tta cga ttt cag tct cca aaa cca ata 358
Ala Glu Pro Pro Ile Gly Pro Leu Arg Phe Gln Ser Pro Lys Pro Ile
70 75 80

tca aat cca aaa aca gga ttc gta cag gct cga act ttg gga gac aaa 406
Ser Asn Pro Lys Thr Gly Phe Val Gln Ala Arg Thr Leu Gly Asp Lys
85 90 95

tgt ttc cag gaa agt cta ata tat tct tat gca gga agc gaa gat tgc 454
Cys Phe Gln Glu Ser Leu Ile Tyr Ser Tyr Ala Gly Ser Glu Asp Cys
100 105 110

tta tat ctg aat ata ttc acg cca gag act gtt aat tct gcg aac aat 502
Leu Tyr Leu Asn Ile Phe Thr Pro Glu Thr Val Asn Ser Ala Asn Asn
115 120 125 130

aca aaa tat cct gta atg ttc t 524
Thr Lys Tyr Pro Val Met Phe
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<210> 11
<211> 137
<212> PRT
<213> Ctenocephalides felis

<400> 11

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20 25 30

His Leu Cys Arg Val Gln Phe Asn Arg Ile Thr Glu Gly Lys Pro Phe
35 40 45

Arg Tyr Lys Asp His Arg Asn Asp Val Tyr Cys Ser Tyr Leu Gly Ile
50 55 60

Pro Tyr Ala Glu Pro Pro Ile Gly Pro Leu Arg Phe Gln Ser Pro Lys
65 70 75 80

Pro Ile Ser Asn Pro Lys Thr Gly Phe Val Gln Ala Arg Thr Leu Gly
85 90 95

Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr Ser Tyr Ala Gly Ser Glu
100 105 110

Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro Glu Thr Val Asn Ser Ala
115 120 125

Asn Asn Thr Lys Tyr Pro Val Met Phe

130

135

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 tgtctcccaa agttcgagcc tgtacgaatc ctgtttttgg atttgatatt ggttttggag 180
 actgaaatcg taatggtcca ataggcgggt cggcataagg aattcccaaa taagaacaat 240
 atacatcatt cctatgatct ttatatcgga acggttttcc ttccgtgatc ctgttaaatt 300
 gaactctgca caaatgctga tctaggttat cccatagtat gcacaagata ggtgtaaata 360
 agaaaaataa aaaaaataaa aataaaacta atgcactact gtgaggtaac attttttatt 420
 gtgtttttta atgcattttg gttgcttaat tggtattatt tatctcgttt tgtttatgat 480
 aaaatagacg ttttgaagac gacatgtcta tcgtatcaac gttc 524

<210> 13
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 <222> (300)..(300)
 <223> At nucleotide 300, r = a or g
 At amino acid residue 100, Xaa = Asn or Asp

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 1 5 10 15
 ctt aga ttt aag cct cca cag aaa gct gag cca tgg caa ggt gtt ttc 95
 Leu Arg Phe Lys Pro Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe
 20 25 30
 aac gcc aca tta tac gga aat gtg tgt aaa tct tta aat ttc ttc ttg 143
 Asn Ala Thr Leu Tyr Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu
 35 40 45
 aag aaa att gaa gga gac gaa gac tgc ttg gta gta aac gtg tac gca 191
 Lys Lys Ile Glu Gly Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala
 50 55 60
 cca aaa aca act tct gat aaa aaa ctt cca gta ttt ttc tgg gtt cat 239

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Pro Lys Thr Thr Ser Asp	Lys Lys Leu Pro Val Phe Phe Trp Val His	
65	70	75
ggt ggt ggt ttt gtg act gga tcc gga aat tta gaa ttc caa agc cca		287
Gly Gly Gly Phe Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro		
80	85	90
gat tat tta gta rat ttt gat gtt att ttc gta act ttc aat tac cga		335
Asp Tyr Leu Val Xaa Phe Asp Val Ile Phe Val Thr Phe Asn Tyr Arg		
	100	105
ttg gga cct ctc gga ttt ctg aat ttg gag ttg gag ggt gct cca gga		383
Leu Gly Pro Leu Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly		
	115	120
aat gta gga tta ttg gat cag gtg gca gct ctg aaa tgg acc aaa gaa		431
Asn Val Gly Leu Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu		
	130	135
aac att gag aaa ttt ggt gga gat cca gaa aat att aca att ggt ggt		479
Asn Ile Glu Lys Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly		
	145	150
gtt tct gct ggt gga gca agt gtt cat tat ctt ttg tta tct cat aca		527
Val Ser Ala Gly Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr		
	160	165
acc act gga ctt tac aaa agg gca att gct caa agt gga agt gct ttt		575
Thr Thr Gly Leu Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Phe		
	180	185
aat cca tgg gcc ttc caa aga cat cca gta aag cgt agt ctt caa ctt		623
Asn Pro Trp Ala Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu		
	195	200
gct gag ata ttg ggt cat ccc aca aac aat act caa gat gct tta gaa		671
Ala Glu Ile Leu Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu		
	210	215
ttc tta caa aaa gcc ccc gta gac agt ctc ctg aag aaa atg cca gct		719
Phe Leu Gln Lys Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala		
	225	230
gaa aca gaa ggt gaa ata ata gaa gag ttt gtc ttc gta cca tca att		767
Glu Thr Glu Gly Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile		
	240	245
gaa aaa gtt ttc cca tcc cac caa cct ttc ttg gaa gaa tca cca ttg		815
Glu Lys Val Phe Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu		
	260	265
gcc aga atg aaa tcc gga tcc ttt aac aaa gta cct tta tta gtt gga		863
Ala Arg Met Lys Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly		
	275	280
ttt aac agt gca gaa gga ctt ttg ttc aaa ttc ttc atg aaa gaa aaa		911
Phe Asn Ser Ala Glu Gly Leu Leu Phe Lys Phe Phe Met Lys Glu Lys		
	290	295
cca gag atg ctg aac caa gct gaa gca gat ttt gaa aga ctc gta cca		959
Pro Glu Met Leu Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro		
	305	310
gcc gaa ttt gaa tta gtc cat gga tca gag gaa tcg aaa aaa ctt gca		1007

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Ala Glu Phe Glu Leu Val His Gly Ser Glu Glu Ser Lys Lys Leu Ala	
320 325 330 335	
gaa aaa atc agg aag ttt tac ttt gac gat aaa ccc gtt cca gaa aat	1055
Glu Lys Ile Arg Lys Phe Tyr Phe Asp Lys Pro Val Pro Glu Asn	
340 345 350	
gaa cag aaa ttt att gac ttg ata gga gat att tgg ttt act aga ggt	1103
Glu Gln Lys Phe Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly	
355 360 365	
gtt gac aag cat gtc aag ttg tct gtg gag aaa caa gac gaa cca gtt	1151
Val Asp Lys His Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val	
370 375 380	
tat tat tat gaa tat tcc ttc tcg gaa agt cat cct gca aaa gga aca	1199
Tyr Tyr Tyr Glu Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr	
385 390 395	
ttt ggt gat cat aat ctg act ggt gca tgc cat gga gaa gaa ctt gtg	1247
Phe Gly Asp His Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val	
400 405 410 415	
aat tta ttc aaa gtc gag atg atg aag ctg gaa aaa gat aaa cct aat	1295
Asn Leu Phe Lys Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn	
420 425 430	
gtt cta tta aca aaa gat aga gta ctt gcc atg tgg act aac ttc atc	1343
Val Leu Leu Thr Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile	
435 440 445	
aaa aat gga aat cct act cct gaa gta aca gaa tta ttg cca gtt aaa	1391
Lys Asn Gly Asn Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys	
450 455 460	
tgg gaa cct gcc aca aaa gac aag ttg aat tat ttg aac att gat gcc	1439
Trp Glu Pro Ala Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala	
465 470 475	
acc tta act ttg gga aca aat cct gag gca aac cga gtc aaa ttt tgg	1487
Thr Leu Thr Leu Gly Thr Asn Pro Glu Ala Asn Arg Val Lys Phe Trp	
480 485 490 495	
gaa gac gcc aca aaa tct ttg cac ggt caa taataattta tgaaaattgt	1537
Glu Asp Ala Thr Lys Ser Leu His Gly Gln	
500 505	
tttaaatact ttaggtaata tattaggttaa ataaaaatta aaaaataaca atttttatgt	1597
tttatgtatt ggcttatgtg tatcagttct aattttatatt atttattctt gttttgcttg	1657
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aaaatacatt aactaaaaat ataagatatt ttcaataatt ttttttaaag aaaataccaa	1837
aaataaagta aaattccaaa cggaattttt gtttaactta aaaataaaat taactcttca	1897
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atttatattt aaaataaaat tatgt	1982

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<210> 14
<211> 505
<212> PRT
<213> Ctenocephalides felis

<220>
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<222> (100)..(100)
<223> The 'Xaa' at location 100 stands for Asp, or Asn.

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Phe Ser Tyr Thr Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu
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Arg Phe Lys Pro Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn
20          25          30

Ala Thr Leu Tyr Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu Lys
35          40          45

Lys Ile Glu Gly Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro
50          55          60

Lys Thr Thr Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val His Gly
65          70          75          80

Gly Gly Phe Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp
85          90          95

Tyr Leu Val Xaa Phe Asp Val Ile Phe Val Thr Phe Asn Tyr Arg Leu
100         105         110

Gly Pro Leu Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn
115         120         125

Val Gly Leu Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu Asn
130         135         140

Ile Glu Lys Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly Val
145         150         155         160

Ser Ala Gly Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr Thr
165         170         175

Thr Gly Leu Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Phe Asn
180         185         190

Pro Trp Ala Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu Ala
195         200         205

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Glu Ile Leu Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe
210 215 220

Leu Gln Lys Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala Glu
225 230 235 240

Thr Glu Gly Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile Glu
245 250 255

Lys Val Phe Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala
260 265 270

Arg Met Lys Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe
275 280 285

Asn Ser Ala Glu Gly Leu Leu Phe Lys Phe Phe Met Lys Glu Lys Pro
290 295 300

Glu Met Leu Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala
305 310 315 320

Glu Phe Glu Leu Val His Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu
325 330 335

Lys Ile Arg Lys Phe Tyr Phe Asp Asp Lys Pro Val Pro Glu Asn Glu
340 345 350

Gln Lys Phe Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly Val
355 360 365

Asp Lys His Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr
370 375 380

Tyr Tyr Glu Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe
385 390 395 400

Gly Asp His Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn
405 410 415

Leu Phe Lys Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn Val
420 425 430

Leu Leu Thr Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys
435 440 445

Asn Gly Asn Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp
450 455 460

Glu Pro Ala Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr
 465 470 475 480

Leu Thr Leu Gly Thr Asn Pro Glu Ala Asn Arg Val Lys Phe Trp Glu
 485 490 495

Asp Ala Thr Lys Ser Leu His Gly Gln
 500 505

<210> 15

<211> 1982

<212> DNA

<213> Ctenocephalides felis

<400> 15

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 cttatatattt tagttaatgt atttttactg atttttagtgt atatataaaa atacttcaga 240
 gtacttaata taacatatct attggaaatt ttgctaaaaa caaacgacgt tgtgttttga 300
 aaattaaaac catgatattt caaaacaagc aaaacaagaa taaataaata aaattagaac 360
 tgatacacat aagccaatac ataaaacata aaaattgtta ttttttaatt tttatttacc 420
 taatatatta cctaaagtat ttaaaacaat tttcataaat tattattgac cgtgcaaaga 480
 ttttgtggcg tcttcccaa atttgactcg gtttgccctca ggatttggtc ccaaagttaa 540
 ggtggcatca atgttcaaat aattcaactt gtcttttgtg gcagggtccc atttaactgg 600
 caataattct gttacttcag gagtaggatt tccatttttg atgaagttag tccacatggc 660
 aagtactcta tcttttgtta atagaacatt aggtttatct ttttccagct tcatcatctc 720
 gactttgaat aaattcacia gttcttctcc atggcatgca ccagtcagat tatgatcacc 780
 aaatgttcct tttgcaggat gactttccga gaaggaatat tcataataat aaactggttc 840
 gtcttggttc tccacagaca acttgacatg cttgtcaaca cctctagtaa accaaatc 900
 tcctatcaag tcaataaatt tctgttcatt ttctggaacg ggtttatcgt caaagtaaaa 960
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 atcttgagta ttgtttgtgg gatgacccaa tatctcagca agttgaagac tacgctttac 1380

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tggatgtctt tggaaggccc atggattaa agcacttcca ctttgagcaa ttgccctttt 1440
gtaaagtcca gtggttgat gagataacaa aagataatga acacttgctc caccagcaga 1500
aacaccacca attgtaatat tttctggatc tccaccaaat ttctcaatgt tttctttggt 1560
ccatttcaga gctgccacct gatccaataa tcctacattt cctggagcac cctccaactc 1620
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accatgaacc cagaaaaata ctggaagttt tttatcagaa gttgtttttg gtgcgtacac 1800
gtttactacc aagcagtctt cgtctccttc aattttcttc aagaagaaat ttaaagattt 1860
acacacattt ccgtataatg tggcgttgaa aacaccttgc catggctcag ctttctgtgg 1920
aggcttaaat ctaagttctc caacaggagg tttagcataa ggtacacctg tgtagctaaa 1980
at 1982

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<210> 16
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<212> DNA
<213> Ctenocephalides felis

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<220>
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<222> (1)..(1515)
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<220>
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<222> (298)..(298)
<223> At nucleotide 298, r = a or g
      At amino acid residue 100, Xaa = Asn or Asp

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1 5 10 15
aga ttt aag cct cca cag aaa gct gag cca tgg caa ggt gtt ttc aac 96
Arg Phe Lys Pro Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn
20 25 30
gcc aca tta tac gga aat gtg tgt aaa tct tta aat ttc ttc ttg aag 144
Ala Thr Leu Tyr Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu Lys
35 40 45
aaa att gaa gga gac gaa gac tgc ttg gta gta aac gtg tac gca cca 192
Lys Ile Glu Gly Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro
50 55 60
aaa aca act tct gat aaa aaa ctt cca gta ttt ttc tgg gtt cat ggt 240
Lys Thr Thr Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val His Gly
65 70 75 80
ggt ggt ttt gtg act gga tcc gga aat tta gaa ttc caa agc cca gat 288
Gly Gly Phe Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp

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85	90	95	
tat tta gta rat ttt gat gtt att ttc gta act ttc aat tac cga ttg			336
Tyr Leu Val Xaa Phe Asp Val Ile Phe Val Thr Phe Asn Tyr Arg Leu			
100	105	110	
gga cct ctc gga ttt ctg aat ttg gag ttg gag ggt gct cca gga aat			384
Gly Pro Leu Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn			
115	120	125	
gta gga tta ttg gat cag gtg gca gct ctg aaa tgg acc aaa gaa aac			432
Val Gly Leu Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu Asn			
130	135	140	
att gag aaa ttt ggt gga gat cca gaa aat att aca att ggt ggt gtt			480
Ile Glu Lys Phe Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly Val			
145	150	155	160
tct gct ggt gga gca agt gtt cat tat ctt ttg tta tct cat aca acc			528
Ser Ala Gly Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr Thr			
165	170	175	
act gga ctt tac aaa agg gca att gct caa agt gga agt gct ttt aat			576
Thr Gly Leu Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Phe Asn			
180	185	190	
cca tgg gcc ttc caa aga cat cca gta aag cgt agt ctt caa ctt gct			624
Pro Trp Ala Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu Ala			
195	200	205	
gag ata ttg ggt cat ccc aca aac aat act caa gat gct tta gaa ttc			672
Glu Ile Leu Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe			
210	215	220	
tta caa aaa gcc ccc gta gac agt ctc ctg aag aaa atg cca gct gaa			720
Leu Gln Lys Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala Glu			
225	230	235	240
aca gaa ggt gaa ata ata gaa gag ttt gtc ttc gta cca tca att gaa			768
Thr Glu Gly Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile Glu			
245	250	255	
aaa gtt ttc cca tcc cac caa cct ttc ttg gaa gaa tca cca ttg gcc			816
Lys Val Phe Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala			
260	265	270	
aga atg aaa tcc gga tcc ttt aac aaa gta cct tta tta gtt gga ttt			864
Arg Met Lys Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe			
275	280	285	
aac agt gca gaa gga ctt ttg ttc aaa ttc ttc atg aaa gaa aaa cca			912
Asn Ser Ala Glu Gly Leu Leu Phe Lys Phe Phe Met Lys Glu Lys Pro			
290	295	300	
gag atg ctg aac caa gct gaa gca gat ttt gaa aga ctc gta cca gcc			960
Glu Met Leu Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala			
305	310	315	320
gaa ttt gaa tta gtc cat gga tca gag gaa tcg aaa aaa ctt gca gaa			1008
Glu Phe Glu Leu Val His Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu			
325	330	335	
aaa atc agg aag ttt tac ttt gac gat aaa ccc gtt cca gaa aat gaa			1056
Lys Ile Arg Lys Phe Tyr Phe Asp Asp Lys Pro Val Pro Glu Asn Glu			

340	345	350	
cag aaa ttt att gac ttg ata gga gat att tgg ttt act aga ggt gtt			1104
Gln Lys Phe Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly Val			
355	360	365	
gac aag cat gtc aag ttg tct gtg gag aaa caa gac gaa cca gtt tat			1152
Asp Lys His Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr			
370	375	380	
tat tat gaa tat tcc ttc tcg gaa agt cat cct gca aaa gga aca ttt			1200
Tyr Tyr Glu Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe			
385	390	395	400
ggt gat cat aat ctg act ggt gca tgc cat gga gaa gaa ctt gtg aat			1248
Gly Asp His Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn			
405	410	415	
tta ttc aaa gtc gag atg atg aag ctg gaa aaa gat aaa cct aat gtt			1296
Leu Phe Lys Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn Val			
420	425	430	
cta tta aca aaa gat aga gta ctt gcc atg tgg act aac ttc atc aaa			1344
Leu Leu Thr Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys			
435	440	445	
aat gga aat cct act cct gaa gta aca gaa tta ttg cca gtt aaa tgg			1392
Asn Gly Asn Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp			
450	455	460	
gaa cct gcc aca aaa gac aag ttg aat tat ttg aac att gat gcc acc			1440
Glu Pro Ala Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr			
465	470	475	480
tta act ttg gga aca aat cct gag gca aac cga gtc aaa ttt tgg gaa			1488
Leu Thr Leu Gly Thr Asn Pro Glu Ala Asn Arg Val Lys Phe Trp Glu			
485	490	495	
gac gcc aca aaa tct ttg cac ggt caa			1515
Asp Ala Thr Lys Ser Leu His Gly Gln			
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<210> 17
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 <213> Ctenocephalides felis

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ttcccattta actggcaata attctgttac ttcaggagta ggatttccat ttttgatgaa	180
gttagtccac atggcaagta ctctatcttt tgtaataaga acattagggt tatctttttc	240
cagcttcac atctcgactt tgaataaatt cacaagttct tctccatggc atgcaccagt	300
cagattatga tcaccaaag ttccttttgc aggatgactt tccgagaagg aatattcata	360
ataataaact gggttcgtctt gtttctccac agacaacttg acatgcttgt caacacctct	420
agtaaacc aa atatctccta tcaagtcaat aaatttctgt tcattttctg gaacgggttt	480

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atcgtcaaag taaaacttcc tgatTTTTTc tgcaagTTTT ttcgattcct ctgatccatg      540
gactaattca aattcggctg gtacgagtct ttcaaaatct gcttcagctt ggttcagcat      600
ctctggTTTT tctttcatga agaatttgaa caaaagtcct tctgcactgt taaatccaac      660
taataaaggt actttgttaa aggatccgga tttcattctg gccaatgggtg attcttccaa      720
gaaagggttg tgggatggga aaactTTTTc aattgatggg acgaagacaa actcttctat      780
tatttcacct tctgtttcag ctggcatttt cttcaggaga ctgtctacgg gggctTTTTg      840
taagaattct aaagcatctt gagtattgtt tgtgggatga cccaatatct cagcaagttg      900
aagactacgc tttactggat gtctttggaa ggcccatgga ttaaaagcac ttccactttg      960
agcaattgcc cttttgtaaa gtccagtggg tgtatgagat aacaaaagat aatgaacact     1020
tgctccacca gcagaaacac caccaattgt aatattttct ggatctccac caaatttctc     1080
aatgttttct ttggtccatt tcagagctgc cacctgatcc aataatccta catttcctgg     1140
agcaccctcc aactccaaat tcagaaatcc gagagggtccc aatcggtaat tgaaagttac     1200
gaaaataaca tcaaaatyta ctaaataatc tgggctttgg aattctaaat ttccggatcc     1260
agtcacaaaa ccaccaccat gaaccagaa aaatactgga agttttttat cagaagttgt     1320
ttttggtgcg tacacgttta ctaccaagca gtcttcgtct ctttcaattt tcttcaagaa     1380
gaaatttaaa gatttacaca catttccgta taatgtggcg ttgaaaacac cttgccatgg     1440
ctcagctttc tgtggaggct taaatctaag ttctccaaca ggagggttag cataaggtag     1500
acctgtgtag ctaaa                                         1515

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<210> 18
<211> 1792
<212> DNA
<213> Ctenocephalides felis

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<223> n = unknown

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Val Ile Phe Leu Ser Cys Ile Phe Leu Phe Ser Phe Asn Phe Ile Lys
5 10 15

tgt gat ccc ccg act gta act ttg ccc cag ggc gaa ttg gtt gga aaa 153
Cys Asp Pro Pro Thr Val Thr Leu Pro Gln Gly Glu Leu Val Gly Lys
20 25 30 35

gct ttg acg aac gaa aat gga aaa gag tat ttt agc tac aca ggt gtg 201
Ala Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr Thr Gly Val
40 45 50

cct tat gct aaa cct cca gtt gga gaa ctt aga ttt aag cct cca cag 249
Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Pro Pro Gln
55 60 65

aaa gct gag cca tgg aat ggt gtt ttc aac gcc aca tca cat gga aat 297
Lys Ala Glu Pro Trp Asn Gly Val Phe Asn Ala Thr Ser His Gly Asn
70 75 80

gtg tgc aaa gct ttg aat ttc ttc ttg aaa aaa att gaa gga gac gaa 345
Val Cys Lys Ala Leu Asn Phe Phe Leu Lys Lys Ile Glu Gly Asp Glu
85 90 95

gac tgc ttg ttg gtg aat gtg tac gca cca aaa aca act tct gac aaa 393
Asp Cys Leu Leu Val Asn Val Tyr Ala Pro Lys Thr Thr Ser Asp Lys
100 105 110 115

aaa ctt cca gta ttt ttc tgg gtt cat ggt ggc ggt ttt gtg act gga 441
Lys Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe Val Thr Gly
120 125 130

tcc gga aat tta gaa ttt caa agc cca gat tat tta gta aat tat gat 489
Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val Asn Tyr Asp
135 140 145

gtt att ttt gta act ttc aat tac cga ttg gga cca ctc gga ttt ttg 537
Val Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu Gly Phe Leu
150 155 160

aat ttg gag ttg gaa ggt gct cct gga aat gta gga tta ttg gat cag 585
Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu Leu Asp Gln
165 170 175

gta gca gct ttg aaa tgg acc aaa gaa aat att gag aaa ttt ggt gga 633
Val Ala Ala Leu Lys Trp Thr Lys Glu Asn Ile Glu Lys Phe Gly Gly
180 185 190 195

gat cca gaa aat att aca att ggt ggt gtt tct gct ggt gga gca agt 681
Asp Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly Gly Ala Ser
200 205 210

gtt cat tat ctt tta ttg tca cat aca acc act gga ctt tac aaa agg 729
Val His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu Tyr Lys Arg
215 220 225

gca att gct caa agt gga agt gct tta aat cca tgg gcc ttc caa aga 777
Ala Ile Ala Gln Ser Gly Ser Ala Leu Asn Pro Trp Ala Phe Gln Arg
230 235 240

cat cca gta aag cgt agt ctt caa ctt gct gag ata tta ggt cat ccc 825
His Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu Gly His Pro

245	250	255	
aca aac aac act caa gat gct tta gaa ttc tta caa aaa gcc cca gta			873
Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe Leu Gln Lys Ala Pro Val			
260	265	270	275
gac agt ctc ctg aaa aaa atg cca gct gaa aca gaa ggt gaa ata ata			921
Asp Ser Leu Leu Lys Lys Met Pro Ala Glu Thr Glu Gly Glu Ile Ile			
	280	285	290
gaa gag ttc gtc ttc gta cca tca att gaa aaa gtt ttc cca tcc cac			969
Glu Glu Phe Val Phe Val Pro Ser Ile Glu Lys Val Phe Pro Ser His			
	295	300	305
caa cct ttc ttg gaa gaa tca cca ttg gcc aga atg aaa tct gga tcc			1017
Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala Arg Met Lys Ser Gly Ser			
	310	315	320
ttt aac aaa gta cct tta tta gtt gga ttc aac agc gca gaa gga ctt			1065
Phe Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala Glu Gly Leu			
	325	330	335
ttg tac aaa ttc ttt atg aaa gaa aaa cca gag atg ctg aac caa gct			1113
Leu Tyr Lys Phe Phe Met Lys Glu Lys Pro Glu Met Leu Asn Gln Ala			
	340	345	350
gaa gca gat ttc gaa aga ctc gta cca gcc gaa ttt gaa tta gcc cat			1161
Glu Ala Asp Phe Glu Arg Leu Val Pro Ala Glu Phe Glu Leu Ala His			
	360	365	370
gga tca gaa gaa tcg aaa aaa ctt gca gaa aaa atc agg aag ttt tac			1209
Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu Lys Ile Arg Lys Phe Tyr			
	375	380	385
ttt gac gat aaa ccc gtt cct gaa aat gag cag aaa ttt att gac ttg			1257
Phe Asp Asp Lys Pro Val Pro Glu Asn Glu Gln Lys Phe Ile Asp Leu			
	390	395	400
ata gga gat att tgg ttt act aga ggc att gac aag cat gtc aag ttg			1305
Ile Gly Asp Ile Trp Phe Thr Arg Gly Ile Asp Lys His Val Lys Leu			
	405	410	415
tct gta gaa aaa caa gac gag cca gta tat tat tat gaa tat tct ttc			1353
Ser Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu Tyr Ser Phe			
	420	425	430
tct gaa agt cat cct gca aaa gga aca ttt ggt gac cat aac ttg act			1401
Ser Glu Ser His Pro Ala Lys Gly Thr Phe Gly Asp His Asn Leu Thr			
	440	445	450
gga gca tgt cat ggt gaa gaa ctt gtg aat tta ttc aaa gtc gag atg			1449
Gly Ala Cys His Gly Glu Glu Leu Val Asn Leu Phe Lys Val Glu Met			
	455	460	465
atg aag ctg gaa aaa gat aaa ccg aat gtt tta tta aca aaa gat agg			1497
Met Lys Leu Glu Lys Asp Lys Pro Asn Val Leu Leu Thr Lys Asp Arg			
	470	475	480
gta ctt gct atg tgg acg aac ttc atc aaa aat gga aat cct act cct			1545
Val Leu Ala Met Trp Thr Asn Phe Ile Lys Asn Gly Asn Pro Thr Pro			
	485	490	495
gaa gta act gaa tta ttg cca gtt aaa tgg gaa cct gcc aca aaa gac			1593
Glu Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala Thr Lys Asp			

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500                               505                               510                               515
aag ttg aat tat ttg aac att gat gcc acc tta act ttg gga aca aat      1641
Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr Leu Thr Leu Gly Thr Asn
                               520                               525                               530

cca gaa gaa acc cga gtc aaa tty tgg gaa gat gcc aca aaa act ttg      1689
Pro Glu Glu Thr Arg Val Lys Phe Trp Glu Asp Ala Thr Lys Thr Leu
                               535                               540                               545

cac agt caa taa aaatgtatga aaattgtttt aattatttta ggtaatacat      1741
His Ser Gln
                               550

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<210> 19
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<212> PRT
<213> Ctenocephalides felis

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Phe Ile Lys Cys Asp Pro Pro Thr Val Thr Leu Pro Gln Gly Glu Leu
                               20                               25                               30

Val Gly Lys Ala Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr
                               35                               40                               45

Thr Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys
                               50                               55                               60

Pro Pro Gln Lys Ala Glu Pro Trp Asn Gly Val Phe Asn Ala Thr Ser
65                               70                               75                               80

His Gly Asn Val Cys Lys Ala Leu Asn Phe Phe Leu Lys Lys Ile Glu
                               85                               90                               95

Gly Asp Glu Asp Cys Leu Leu Val Asn Val Tyr Ala Pro Lys Thr Thr
                               100                               105                               110

Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe
                               115                               120                               125

Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val
                               130                               135                               140

Asn Tyr Asp Val Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu
145                               150                               155                               160

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Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu
165 170 175

Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu Asn Ile Glu Lys
180 185 190

Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly
195 200 205

Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu
210 215 220

Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Leu Asn Pro Trp Ala
225 230 235 240

Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu
245 250 255

Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe Leu Gln Lys
260 265 270

Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala Glu Thr Glu Gly
275 280 285

Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile Glu Lys Val Phe
290 295 300

Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala Arg Met Lys
305 310 315 320

Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala
325 330 335

Glu Gly Leu Leu Tyr Lys Phe Phe Met Lys Glu Lys Pro Glu Met Leu
340 345 350

Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala Glu Phe Glu
355 360 365

Leu Ala His Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu Lys Ile Arg
370 375 380

Lys Phe Tyr Phe Asp Asp Lys Pro Val Pro Glu Asn Glu Gln Lys Phe
385 390 395 400

Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly Ile Asp Lys His
405 410 415

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Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu
420 425 430

Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe Gly Asp His
435 440 445

Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn Leu Phe Lys
450 455 460

Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn Val Leu Leu Thr
465 470 475 480

Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys Asn Gly Asn
485 490 495

Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala
500 505 510

Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr Leu Thr Leu
515 520 525

Gly Thr Asn Pro Glu Glu Thr Arg Val Lys Phe Trp Glu Asp Ala Thr
530 535 540

Lys Thr Leu His Ser Gln
545 550

<210> 20
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<220>
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<212> DNA
<213> Ctenocephalides felis

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<220>
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Phe	Ile	Lys	Cys	Asp	Pro	Pro	Thr	Val	Thr	Leu	Pro	Gln	Gly	Glu	Leu	
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ggt	gga	aaa	gct	ttg	acg	aac	gaa	aat	gga	aaa	gag	tat	ttt	agc	tac	144
Val	Gly	Lys	Ala	Leu	Thr	Asn	Glu	Asn	Gly	Lys	Glu	Tyr	Phe	Ser	Tyr	
		35					40				45					
aca	ggt	gtg	cct	tat	gct	aaa	cct	cca	ggt	gga	gaa	ctt	aga	ttt	aag	192
Thr	Gly	Val	Pro	Tyr	Ala	Lys	Pro	Pro	Val	Gly	Glu	Leu	Arg	Phe	Lys	
	50					55					60					
cct	cca	cag	aaa	gct	gag	cca	tgg	aat	ggt	ggt	ttc	aac	gcc	aca	tca	240
Pro	Pro	Gln	Lys	Ala	Glu	Pro	Trp	Asn	Gly	Val	Phe	Asn	Ala	Thr	Ser	
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His	Gly	Asn	Val	Cys	Lys	Ala	Leu	Asn	Phe	Leu	Lys	Lys	Ile	Glu		
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Gly	Asp	Glu	Asp	Cys	Leu	Leu	Val	Asn	Val	Tyr	Ala	Pro	Lys	Thr	Thr	
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Ser	Asp	Lys	Lys	Leu	Pro	Val	Phe	Phe	Trp	Val	His	Gly	Gly	Gly	Phe	
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Val	Thr	Gly	Ser	Gly	Asn	Leu	Glu	Phe	Gln	Ser	Pro	Asp	Tyr	Leu	Val	
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Leu	Asp	Gln	Val	Ala	Ala	Leu	Lys	Trp	Thr	Lys	Glu	Asn	Ile	Glu	Lys	
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Phe	Gly	Gly	Asp	Pro	Glu	Asn	Ile	Thr	Ile	Gly	Gly	Val	Ser	Ala	Gly	
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gga	gca	agt	ggt	cat	tat	ctt	tta	ttg	tca	cat	aca	acc	act	gga	ctt	672
Gly	Ala	Ser	Val	His	Tyr	Leu	Leu	Leu	Ser	His	Thr	Thr	Thr	Gly	Leu	
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Tyr	Lys	Arg	Ala	Ile	Ala	Gln	Ser	Gly	Ser	Ala	Leu	Asn	Pro	Trp	Ala	
225					230					235					240	
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Phe	Gln	Arg	His	Pro	Val	Lys	Arg	Ser	Leu	Gln	Leu	Ala	Glu	Ile	Leu	
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Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala																
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Glu Gly Leu Leu Tyr Lys Phe Phe Met Lys Glu Lys Pro Glu Met Leu																
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Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala Glu Phe Glu																
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Lys Phe Tyr Phe Asp Lys Lys Pro Val Pro Glu Asn Glu Gln Lys Phe																
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gtc aag ttg tct gta gaa aaa caa gac gag cca gta tat tat tat gaa																1296
Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu																
				420						425					430	
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Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe Gly Asp His																
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Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn Leu Phe Lys																
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Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys Asn Gly Asn																
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cct act cct gaa gta act gaa tta ttg cca gtt aaa tgg gaa cct gcc																1536
Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala																
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aaa act ttg cac agt caa 1650
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<213> Ctenocephalides felis

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ttcccattta actggcaata attcagttac ttcaggagta ggatttccat ttttgatgaa 180
gttcgtccac atagcaagta ccttatcttt tgttaataaa acattcgggt tatctttttc 240
cagcttcac atctcgactt tgaataaatt cacaagttct tcaccatgac atgctccagt 300
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acctgtgtag ctaaaatact cttttccatt ttcgttcgtc aaagcttttc caaccaattc 1560
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Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr Thr Gly Val Pro
20 25 30

tat gct aaa cct cca gtt gga gaa ctt aga ttt aag cct cca cag aaa 144
Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Pro Pro Gln Lys
35 40 45

gct gag cca tgg aat ggt gtt ttc aac gcc aca tca cat gga aat gtg 192
Ala Glu Pro Trp Asn Gly Val Phe Asn Ala Thr Ser His Gly Asn Val
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tgc aaa gct ttg aat ttc ttc ttg aaa aaa att gaa gga gac gaa gac 240
Cys Lys Ala Leu Asn Phe Phe Leu Lys Lys Ile Glu Gly Asp Glu Asp
65 70 75 80

tgc ttg ttg gtg aat gtg tac gca cca aaa aca act tct gac aaa aaa 288
Cys Leu Leu Val Asn Val Tyr Ala Pro Lys Thr Thr Ser Asp Lys Lys
85 90 95

ctt cca gta ttt ttc tgg gtt cat ggt ggc ggt ttt gtg act gga tcc 336
Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe Val Thr Gly Ser
100 105 110

gga aat tta gaa ttt caa agc cca gat tat tta gta aat tat gat gtt 384
Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val Asn Tyr Asp Val
115 120 125

att ttt gta act ttc aat tac cga ttg gga cca ctc gga ttt ttg aat 432
Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu Gly Phe Leu Asn
130 135 140

ttg gag ttg gaa ggt gct cct gga aat gta gga tta ttg gat cag gta 480
Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu Leu Asp Gln Val
145 150 155 160

gca gct ttg aaa tgg acc aaa gaa aat att gag aaa ttt ggt gga gat 528

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Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly Gly Ala Ser Val	
180 185 190	
cat tat ctt tta ttg tca cat aca acc act gga ctt tac aaa agg gca	624
His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu Tyr Lys Arg Ala	
195 200 205	
att gct caa agt gga agt gct tta aat cca tgg gcc ttc caa aga cat	672
Ile Ala Gln Ser Gly Ser Ala Leu Asn Pro Trp Ala Phe Gln Arg His	
210 215 220	
cca gta aag cgt agt ctt caa ctt gct gag ata tta ggt cat ccc aca	720
Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu Gly His Pro Thr	
225 230 235 240	
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Ser Leu Leu Lys Lys Met Pro Ala Glu Thr Glu Gly Glu Ile Ile Glu	
260 265 270	
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Glu Phe Val Phe Val Pro Ser Ile Glu Lys Val Phe Pro Ser His Gln	
275 280 285	
cct ttc ttg gaa gaa tca cca ttg gcc aga atg aaa tct gga tcc ttt	912
Pro Phe Leu Glu Glu Ser Pro Leu Ala Arg Met Lys Ser Gly Ser Phe	
290 295 300	
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Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala Glu Gly Leu Leu	
305 310 315 320	
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325 330 335	
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Ser Glu Glu Ser Lys Lys Leu Ala Glu Lys Ile Arg Lys Phe Tyr Phe	
355 360 365	
gac gat aaa ccc gtt cct gaa aat gag cag aaa ttt att gac ttg ata	1152
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385 390 395 400	
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Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu Tyr Ser Phe Ser	
405 410 415	
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Lys Leu Glu Lys Asp Lys Pro Asn Val Leu Leu Thr Lys Asp Arg Val	
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Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala Thr Lys Asp Lys	
485 490 495	
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Ser Gln	
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Met Leu Pro His Ser Ser	
1 5	
gca tta gtt tta ttt tta ttt ttt tta ttt ttc tta ttt aca cct atc	164
Ala Leu Val Leu Phe Leu Phe Phe Leu Phe Phe Leu Phe Thr Pro Ile	
10 15 20	
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Leu Cys Ile Leu Trp Asp Asn Leu Asp Gln His Leu Cys Arg Val Gln	
25 30 35	

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aca gga ttc gta cag gct cga act ttg gga gac aaa tgt ttc cag gaa Thr Gly Phe Val Gln Ala Arg Thr Leu Gly Asp Lys Cys Phe Gln Glu 90 95 100	404
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ata ttc acg cca gag act gtt aat tct gcg aac aat aca aaa tat cct Ile Phe Thr Pro Glu Thr Val Asn Ser Ala Asn Asn Thr Lys Tyr Pro 120 125 130	500
gta atg ttc tgg atc cat gga ggc gca ttc aac caa gga tca gga tct Val Met Phe Trp Ile His Gly Gly Ala Phe Asn Gln Gly Ser Gly Ser 135 140 145 150	548
tat aat ttt ttt gga cct gat tat ttg atc agg gaa gga att att ttg Tyr Asn Phe Phe Gly Pro Asp Tyr Leu Ile Arg Glu Gly Ile Ile Leu 155 160 165	596
gtc act atc aac tat aga tta gga gtt ttc ggt ttt cta tca gcg ccg Val Thr Ile Asn Tyr Arg Leu Gly Val Phe Gly Phe Leu Ser Ala Pro 170 175 180	644
gaa tgg gat atc cat gga aat atg ggt cta aaa gac cag aga ttg gca Glu Trp Asp Ile His Gly Asn Met Gly Leu Lys Asp Gln Arg Leu Ala 185 190 195	692
cta aaa tgg gtt tac gac aac atc gaa aag ttt ggt gga gac aga gaa Leu Lys Trp Val Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Glu 200 205 210	740
aaa att aca att gct gga gaa tct gct gga gca gca agt gtc cat ttt Lys Ile Thr Ile Ala Gly Glu Ser Ala Gly Ala Ala Ser Val His Phe 215 220 225 230	788
ctg atg atg gac aac tcg act aga aaa tac tac caa agg gcc att ttg Leu Met Met Asp Asn Ser Thr Arg Lys Tyr Tyr Gln Arg Ala Ile Leu 235 240 245	836
cag agt ggg aca tta cta aat ccg act gct aat caa att caa ctt ctg Gln Ser Gly Thr Leu Leu Asn Pro Thr Ala Asn Gln Ile Gln Leu Leu 250 255 260	884
cat aga ttt gaa aaa ctc aaa caa gtg cta aac atc acg caa aaa caa His Arg Phe Glu Lys Leu Lys Gln Val Leu Asn Ile Thr Gln Lys Gln 265 270 275	932
gaa ctc cta aac ctg gat aaa aac cta att tta cga gca gcc tta aac Glu Leu Leu Asn Leu Asp Lys Asn Leu Ile Leu Arg Ala Ala Leu Asn 280 285 290	980

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aga gtt cct gat agc aac gac cat gac cga gac aca gta cca gta ttt Arg Val Pro Asp Ser Asn Asp His Asp Arg Asp Thr Val Pro Val Phe 295 300 305 310	1028
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acc aga gga aac atg gaa gtt cac aag act ttg aca aat ata gaa agg Thr Arg Gly Asn Met Glu Val His Lys Thr Leu Thr Asn Ile Glu Arg 360 365 370	1220
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gag aaa aaa cta ata aaa atg ctt aca gag ttt tat gac caa gtg aaa Glu Lys Lys Leu Ile Lys Met Leu Thr Glu Phe Tyr Asp Gln Val Lys 395 400 405	1316
gaa caa aac gat gac att gaa gcc tac gtc caa cta aaa ggc gat gct Glu Gln Asn Asp Asp Ile Glu Ala Tyr Val Gln Leu Lys Gly Asp Ala 410 415 420	1364
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ttg cca gga gtt agt cat ggt gat gat tta gga tat ctt ttt gca aac Leu Pro Gly Val Ser His Gly Asp Asp Leu Gly Tyr Leu Phe Ala Asn 475 480 485	1556
tcg ttg gat gtt cct att ttg gga aca acg cac att tct ata ccg caa Ser Leu Asp Val Pro Ile Leu Gly Thr Thr His Ile Ser Ile Pro Gln 490 495 500	1604
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gaa cca aaa tat ttg gac atg gga aaa gaa aat ttt gaa atg aaa aat	1796
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Ile Leu Glu Leu Lys Arg Met Met Leu Trp Asp Glu Val Tyr Arg Asn	
570 575 580	
gcg aat ttg cgg ttt aga gtc tgt aat gaa gaa agt att aga tga	1889
Ala Asn Leu Arg Phe Arg Val Cys Asn Glu Glu Ser Ile Arg	
585 590 595	
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gaaaaagaaa aatcacatgg accatagtaa ctttattaca tgatttagtt tcaagtgtat	2009
caagaaaact tattgcatca aagaaaatat ttttttgcca aaattcctgg aaaaacactt	2069
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20 25 30

His Leu Cys Arg Val Gln Phe Asn Gly Ile Thr Glu Gly Lys Pro Phe
35 40 45

Arg Tyr Lys Asp His Arg Asn Asp Val Tyr Cys Ser Tyr Leu Gly Ile
 50 55 60

Pro Tyr Ala Glu Pro Pro Phe Gly Pro Leu Arg Phe Gln Ser Pro Lys
 65 70 75 80

Pro Ile Ser Asn Pro Lys Thr Gly Phe Val Gln Ala Arg Thr Leu Gly
 85 90 95

Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr Ser Tyr Ala Gly Ser Glu
 100 105 110

Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro Glu Thr Val Asn Ser Ala
 115 120 125

Asn Asn Thr Lys Tyr Pro Val Met Phe Trp Ile His Gly Gly Ala Phe
 130 135 140

Asn Gln Gly Ser Gly Ser Tyr Asn Phe Phe Gly Pro Asp Tyr Leu Ile
 145 150 155 160

Arg Glu Gly Ile Ile Leu Val Thr Ile Asn Tyr Arg Leu Gly Val Phe
 165 170 175

Gly Phe Leu Ser Ala Pro Glu Trp Asp Ile His Gly Asn Met Gly Leu
 180 185 190

Lys Asp Gln Arg Leu Ala Leu Lys Trp Val Tyr Asp Asn Ile Glu Lys
 195 200 205

Phe Gly Gly Asp Arg Glu Lys Ile Thr Ile Ala Gly Glu Ser Ala Gly
 210 215 220

Ala Ala Ser Val His Phe Leu Met Met Asp Asn Ser Thr Arg Lys Tyr
 225 230 235 240

Tyr Gln Arg Ala Ile Leu Gln Ser Gly Thr Leu Leu Asn Pro Thr Ala
 245 250 255

Asn Gln Ile Gln Leu Leu His Arg Phe Glu Lys Leu Lys Gln Val Leu
 260 265 270

Asn Ile Thr Gln Lys Gln Glu Leu Leu Asn Leu Asp Lys Asn Leu Ile
 275 280 285

Leu Arg Ala Ala Leu Asn Arg Val Pro Asp Ser Asn Asp His Asp Arg
 290 295 300

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Asp Thr Val Pro Val Phe Asn Pro Val Leu Glu Ser Pro Glu Ser Pro
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 Asp Pro Ile Thr Phe Pro Ser Ala Leu Glu Arg Met Arg Asn Gly Glu
 325 330 335

 Phe Pro Asp Val Asp Val Ile Ile Gly Phe Asn Ser Ala Glu Gly Leu
 340 345 350

 Arg Ser Met Ala Arg Val Thr Arg Gly Asn Met Glu Val His Lys Thr
 355 360 365

 Leu Thr Asn Ile Glu Arg Ala Ile Pro Arg Asp Ala Asn Ile Trp Lys
 370 375 380

 Asn Pro Asn Gly Ile Glu Glu Lys Lys Leu Ile Lys Met Leu Thr Glu
 385 390 395 400

 Phe Tyr Asp Gln Val Lys Glu Gln Asn Asp Asp Ile Glu Ala Tyr Val
 405 410 415

 Gln Leu Lys Gly Asp Ala Gly Tyr Leu Gln Gly Ile Tyr Arg Thr Leu
 420 425 430

 Lys Ala Ile Phe Phe Asn Glu Phe Arg Arg Asn Ser Asn Leu Tyr Leu
 435 440 445

 Tyr Arg Leu Ser Asp Asp Thr Tyr Ser Val Tyr Lys Ser Tyr Ile Leu
 450 455 460

 Pro Tyr Arg Trp Gly Ser Leu Pro Gly Val Ser His Gly Asp Asp Leu
 465 470 475 480

 Gly Tyr Leu Phe Ala Asn Ser Leu Asp Val Pro Ile Leu Gly Thr Thr
 485 490 495

 His Ile Ser Ile Pro Gln Asp Ala Met Gln Thr Leu Glu Arg Met Val
 500 505 510

 Arg Ile Trp Thr Asn Phe Val Lys Asn Gly Lys Pro Thr Ser Asn Thr
 515 520 525

 Glu Asp Ala Ser Cys Asp Thr Lys Arg His Leu Asn Asp Ile Phe Trp
 530 535 540

 Glu Pro Tyr Asn Asp Glu Glu Pro Lys Tyr Leu Asp Met Gly Lys Glu
 545 550 555 560

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Asn Phe Glu Met Lys Asn Ile Leu Glu Leu Lys Arg Met Met Leu Trp
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580 585 590

Glu Ser Ile Arg
595

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tgtattttac atgttgacat taatccatat caccgtaata taaaatgata tagaaaagtc 180
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gatagataaa aaatagttta atttacaaca ttaactctaa tttaatgggtc ttgtttacact 360
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1 5 10 15	
acg gaa gga aaa ccg ttc cga tat aaa gat cat agg aat gat gta tat	96
Thr Glu Gly Lys Pro Phe Arg Tyr Lys Asp His Arg Asn Asp Val Tyr	
20 25 30	
tgt tct tat ttg gga att cct tat gcc gaa ccg cct ttt gga cca tta	144
Cys Ser Tyr Leu Gly Ile Pro Tyr Ala Glu Pro Pro Phe Gly Pro Leu	
35 40 45	
cga ttt cag tct cca aaa cca ata tca aat cca aaa aca gga ttc gta	192
Arg Phe Gln Ser Pro Lys Pro Ile Ser Asn Pro Lys Thr Gly Phe Val	
50 55 60	
cag gct cga act ttg gga gac aaa tgt ttc cag gaa agt cta ata tat	240
Gln Ala Arg Thr Leu Gly Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr	
65 70 75 80	
tct tat gca gga agc gaa gat tgc tta tat ctg aat ata ttc acg cca	288
Ser Tyr Ala Gly Ser Glu Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro	
85 90 95	
gag act gtt aat tct gcg aac aat aca aaa tat cct gta atg ttc tgg	336
Glu Thr Val Asn Ser Ala Asn Asn Thr Lys Tyr Pro Val Met Phe Trp	
100 105 110	
atc cat gga ggc gca ttc aac caa gga tca gga tct tat aat ttt ttt	384
Ile His Gly Gly Ala Phe Asn Gln Gly Ser Gly Ser Tyr Asn Phe Phe	
115 120 125	
gga cct gat tat ttg atc agg gaa gga att att ttg gtc act atc aac	432
Gly Pro Asp Tyr Leu Ile Arg Glu Gly Ile Ile Leu Val Thr Ile Asn	
130 135 140	
tat aga tta gga gtt ttc ggt ttt cta tca gcg ccg gaa tgg gat atc	480
Tyr Arg Leu Gly Val Phe Gly Phe Leu Ser Ala Pro Glu Trp Asp Ile	
145 150 155 160	
cat gga aat atg ggt cta aaa gac cag aga ttg gca cta aaa tgg gtt	528
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165 170 175	
tac gac aac atc gaa aag ttt ggt gga gac aga gaa aaa att aca att	576
Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Glu Lys Ile Thr Ile	
180 185 190	
gct gga gaa tct gct gga gca gca agt gtc cat ttt ctg atg atg gac	624
Ala Gly Glu Ser Ala Gly Ala Ala Ser Val His Phe Leu Met Met Asp	
195 200 205	
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Asn Ser Thr Arg Lys Tyr Tyr Gln Arg Ala Ile Leu Gln Ser Gly Thr	
210 215 220	
tta cta aat ccg act gct aat caa att caa ctt ctg cat aga ttt gaa	720
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225 230 235 240	

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aat tcc aat ttg tat ttg tac agg tta tca gac gat acg tat agt gta Asn Ser Asn Leu Tyr Leu Tyr Arg Leu Ser Asp Asp Thr Tyr Ser Val 420 425 430	1296
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tta aac gac att ttt tgg gaa cca tac aac gac gaa gaa cca aaa tat      1584
Leu Asn Asp Ile Phe Trp Glu Pro Tyr Asn Asp Glu Glu Pro Lys Tyr
                    515                    520                    525

ttg gac atg gga aaa gaa aat ttt gaa atg aaa aat att ttg gaa cta      1632
Leu Asp Met Gly Lys Glu Asn Phe Glu Met Lys Asn Ile Leu Glu Leu
                    530                    535                    540

aaa cgc atg atg ctt tgg gat gaa gtt tat aga aat gcg aat ttg cgg      1680
Lys Arg Met Met Leu Trp Asp Glu Val Tyr Arg Asn Ala Asn Leu Arg
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1                    5                    10                    15

ttc tta ttt aca cct atc ttg tgc ata cta tgg gat aac cta gat cag      96
Phe Leu Phe Thr Pro Ile Leu Cys Ile Leu Trp Asp Asn Leu Asp Gln
20                    25                    30

cat ttg tgc aga gtt caa ttt aac ggg atc acg gaa gga aaa ccg ttc      144
His Leu Cys Arg Val Gln Phe Asn Gly Ile Thr Glu Gly Lys Pro Phe
35                    40                    45

cga tat aaa gat cat agg aat gat gta tat tgt tct tat ttg gga att      192
Arg Tyr Lys Asp His Arg Asn Asp Val Tyr Cys Ser Tyr Leu Gly Ile
50                    55                    60

cct tat gcc gaa ccg cct ttt gga cca tta cga ttt cag tct cca aaa      240
Pro Tyr Ala Glu Pro Pro Phe Gly Pro Leu Arg Phe Gln Ser Pro Lys
65                    70                    75                    80

cca ata tca aat cca aaa aca gga ttc gta cag gct cga act ttg gga      288
Pro Ile Ser Asn Pro Lys Thr Gly Phe Val Gln Ala Arg Thr Leu Gly
85                    90                    95

gac aaa tgt ttc cag gaa agt cta ata tat tct tat gca gga agc gaa      336
Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr Ser Tyr Ala Gly Ser Glu
100                    105                    110

gat tgc tta tat ctg aat ata ttc acg cca gag act gtt aat tct gcg      384
Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro Glu Thr Val Asn Ser Ala

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Gln Leu Lys Gly Asp Ala Gly Tyr Leu Gln Gly Ile Tyr Arg Thr Leu			
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Pro Tyr Arg Trp Gly Ser Leu Pro Gly Val Ser His Gly Asp Asp Leu			
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cac att tct ata ccg caa gat gct atg cag act ctg gaa agg atg gtc			1536
His Ile Ser Ile Pro Gln Asp Ala Met Gln Thr Leu Glu Arg Met Val			
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Arg Ile Trp Thr Asn Phe Val Lys Asn Gly Lys Pro Thr Ser Asn Thr			
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Glu Asp Ala Ser Cys Asp Thr Lys Arg His Leu Asn Asp Ile Phe Trp			
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Glu Pro Tyr Asn Asp Glu Glu Pro Lys Tyr Leu Asp Met Gly Lys Glu			
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tta gtt tta ttt tta ttt ttt tta ttt ttc tta ttt aca cct gtc ttg      164
Leu Val Leu Phe Leu Phe Phe Leu Phe Phe Leu Phe Thr Pro Val Leu
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tgc ata cta tgg gat aac cta gat cag cat ttg tgc aga gtt caa ttt      212
Cys Ile Leu Trp Asp Asn Leu Asp Gln His Leu Cys Arg Val Gln Phe
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Asn Gly Ile Thr Glu Gly Lys Pro Phe Arg Tyr Lys Asp His Lys Asn
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gat gta tat tgt tcc tat ttg gga att cct tat gca gaa ccg cct att      308
Asp Val Tyr Cys Ser Tyr Leu Gly Ile Pro Tyr Ala Glu Pro Pro Ile
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Gly Pro Leu Arg Phe Gln Ser Pro Lys Pro Ile Ser Asn Pro Lys Thr
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Leu Ile Tyr Ser Tyr Ala Gly Ser Glu Asp Cys Leu Tyr Leu Asn Ile
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Lys Trp Val Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Asp Lys			
200	205	210	
atc act ata gct gga gaa tct gct gga gca gca agt gtt cat ttt ctg			788
Ile Thr Ile Ala Gly Glu Ser Ala Gly Ala Ser Val His Phe Leu			
215	220	225	230
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Arg Phe Glu Lys Leu Lys Gln Val Leu Asn Ile Thr Gln Lys Gln Glu			
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ctc cta aat ctg gac aaa aat caa att ttg cga gca gcc tta aac aga			980
Leu Leu Asn Leu Asp Lys Asn Gln Ile Leu Arg Ala Ala Leu Asn Arg			
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Val Pro Asp Asn Asn Asp His Glu Arg Asp Thr Val Pro Val Phe Asn			
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cca gtc cta gaa tca cca gaa tct cca gac cca ata aca ttt cca tct			1076
Pro Val Leu Glu Ser Pro Glu Ser Pro Asp Pro Ile Thr Phe Pro Ser			
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	345	350	355
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Arg Gly Asn Met Glu Val Tyr Lys Thr Leu Thr Asn Ile Glu Arg Ala			
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Lys Lys Leu Ile Lys Met Leu Thr Glu Phe Tyr Asp Gln Val Lys Glu			
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caa aac gat gac atc gaa gcc tat gtc caa cta aaa ggc gat gct ggt			1364
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210 215 220

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Thr Val Pro Val Phe Asn Pro Val Leu Glu Ser Pro Glu Ser Pro Asp
305 310 315 320

Pro Ile Thr Phe Pro Ser Ala Leu Glu Arg Met Arg Asn Gly Glu Phe
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Pro Asp Val Asp Val Ile Ile Gly Phe Asn Ser Ala Glu Gly Leu Arg
340 345 350

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370 375 380

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Pro Tyr Asn Asp Glu Glu Pro Lys Tyr Leu Asp Met Gly Lys Glu His
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Phe Glu Met Lys Asn Ile Leu Glu Leu Lys Arg Met Met Leu Trp Asp
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Thr Glu Gly Lys Pro Phe Arg Tyr Lys Asp His Lys Asn Asp Val Tyr	
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Cys Ser Tyr Leu Gly Ile Pro Tyr Ala Glu Pro Pro Ile Gly Pro Leu	
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Arg Phe Gln Ser Pro Lys Pro Ile Ser Asn Pro Lys Thr Gly Phe Val	
50 55 60	
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Gln Ala Arg Ser Leu Gly Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr	
65 70 75 80	
tct tat gca gga agc gaa gat tgc tta tat ctg aat ata ttc acg cca	288
Ser Tyr Ala Gly Ser Glu Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro	
85 90 95	
gag act gtt aat tct gcg aac aat aca aaa tat cct gta atg ttc tgg	336
Glu Thr Val Asn Ser Ala Asn Asn Thr Lys Tyr Pro Val Met Phe Trp	
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atc cat gga ggc gca ttc aac caa gga tca gga tct tat aat ttt ttt	384
Ile His Gly Gly Ala Phe Asn Gln Gly Ser Gly Ser Tyr Asn Phe Phe	
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Leu Cys Arg Val Gln Phe Asn Gly Ile Thr Glu Gly Lys Pro Phe Arg	35	40	45	
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Tyr Lys Asp His Lys Asn Asp Val Tyr Cys Ser Tyr Leu Gly Ile Pro	50	55	60	
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Tyr Ala Glu Pro Pro Ile Gly Pro Leu Arg Phe Gln Ser Pro Lys Pro	65	70	75	80
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Ile Ser Asn Pro Lys Thr Gly Phe Val Gln Ala Arg Ser Leu Gly Asp	85	90	95	
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Lys Cys Phe Gln Glu Ser Leu Ile Tyr Ser Tyr Ala Gly Ser Glu Asp	100	105	110	
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Cys Leu Tyr Leu Asn Ile Phe Thr Pro Glu Thr Val Asn Ser Ala Asn	115	120	125	
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Asn Thr Lys Tyr Pro Val Met Phe Trp Ile His Gly Gly Ala Phe Asn	130	135	140	
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15 20 25

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Ser Gly Ile Pro Tyr Ala Lys Pro Pro Val Gly Asp Leu Arg Phe Lys
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Pro Pro Gln Pro Ala Glu Pro Trp Ser Gly Val Leu Asp Ala Ser Lys
50 55 60

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Glu Gly Asn Ser Cys Arg Ser Val His Phe Ile Lys Lys Ile Lys Val
65 70 75

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80 85 90

gag aaa tca ctt ctt cca gta atg gta tgg ata cat gga gga ggc ttc 337
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	240	245	250
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Gln Ala Pro Ile Asp Asp Leu Ile Asp Asn Arg Ile Lys Pro Lys Asp			
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aaa ggc caa ctt att ata gac tat cct ttt cta cca aca ata gaa aaa			865
Lys Gly Gln Leu Ile Ile Asp Tyr Pro Phe Leu Pro Thr Ile Glu Lys			
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cgt tat caa aat ttt gaa cca ttc ttg gac cag tct cca tta tca aaa			913
Arg Tyr Gln Asn Phe Glu Pro Phe Leu Asp Gln Ser Pro Leu Ser Lys			
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atg caa tca ggc aat ttc aca aaa gtc cca ttt ata tgt gga tac aac			961
Met Gln Ser Gly Asn Phe Thr Lys Val Pro Phe Ile Cys Gly Tyr Asn			
	305	310	315
agt gct gaa gga att tta ggt tta atg gac ttc aag gat gac cca aat			1009
Ser Ala Glu Gly Ile Leu Gly Leu Met Asp Phe Lys Asp Asp Pro Asn			
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ata ttt gag aag ttt gaa gct gat ttt gaa aga ttt gta cca gta gat			1057
Ile Phe Glu Lys Phe Glu Ala Asp Phe Glu Arg Phe Val Pro Val Asp			
	335	340	345
ttg aat cta act tta agg tct aag gaa tct aaa aaa ttg gct gaa gaa			1105
Leu Asn Leu Thr Leu Arg Ser Lys Glu Ser Lys Lys Leu Ala Glu Glu			

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350          355          360          365
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          370          375          380

gaa aaa ttt gtc agt gtt att agt gat act tgg ttt ttg aga ggg att 1201
Glu Lys Phe Val Ser Val Ile Ser Asp Thr Trp Phe Leu Arg Gly Ile
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aaa aat act gca aga tat ata att gaa cat tcc tca gaa ccg tta tat 1249
Lys Asn Thr Ala Arg Tyr Ile Ile Glu His Ser Ser Glu Pro Leu Tyr
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tta tat gtt tat agt ttt gat gat ttt ggt ttt ttg aag aaa ctt gta 1297
Leu Tyr Val Tyr Ser Phe Asp Asp Phe Gly Phe Leu Lys Lys Leu Val
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Leu Asp Pro Asn Ile Glu Gly Ala Ala His Gly Asp Glu Leu Gly Tyr
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ctt ttc aag atg agt ttt aca gaa ttt cca aaa gat tta cca agt gca 1393
Leu Phe Lys Met Ser Phe Thr Glu Phe Pro Lys Asp Leu Pro Ser Ala
          450          455          460

gtg gtg aat agg gaa cga ttg ttg caa ctt tgg aca aat ttt gca aaa 1441
Val Val Asn Arg Glu Arg Leu Leu Gln Leu Trp Thr Asn Phe Ala Lys
          465          470          475

aca gga aat ccc act cct gaa atc aat gat gtt ata aca aca aaa tgg 1489
Thr Gly Asn Pro Thr Pro Glu Ile Asn Asp Val Ile Thr Thr Lys Trp
          480          485          490

gat aaa gct act gag gaa aaa tca gat cat atg gat atc gat aat act 1537
Asp Lys Ala Thr Glu Glu Lys Ser Asp His Met Asp Ile Asp Asn Thr
          495          500          505

ttg aga atg att cca gat cct gat gca aaa cga ctt aga ttt tgg aat 1585
Leu Arg Met Ile Pro Asp Pro Asp Ala Lys Arg Leu Arg Phe Trp Asn
          510          515          520          525

aaa ttt tta tgataaatat accaattatc gattttatta tagagtttct 1634
Lys Phe Leu

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tttcgatttc aaatttactc tgattattgg aaaaaaagct tttacagttg taataatcaa 1754

gaagtaggtg gtaaatttag aacaaattct gttttagtga ttg'gcgcatt caacagatgg 1814

tgtactgtgc cttaaatttgt cgctcttctt gaagaactga actaaaaatg tgattaatgg 1874

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<210> 37
<211> 528
<212> PRT

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<213> Ctenocephalides felis

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 35 40 45

Pro Ala Glu Pro Trp Ser Gly Val Leu Asp Ala Ser Lys Glu Gly Asn
 50 55 60

Ser Cys Arg Ser Val His Phe Ile Lys Lys Ile Lys Val Gly Ala Glu
 65 70 75 80

Asp Cys Leu Tyr Leu Asn Val Tyr Val Pro Lys Thr Ser Glu Lys Ser
 85 90 95

Leu Leu Pro Val Met Val Trp Ile His Gly Gly Gly Phe Phe Met Gly
 100 105 110

Ser Gly Asn Ser Asp Met Tyr Gly Pro Glu Tyr Leu Met Asp Tyr Gly
 115 120 125

Ile Val Leu Val Thr Phe Asn Tyr Arg Leu Gly Val Leu Gly Phe Leu
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Asn Leu Gly Ile Glu Glu Ala Pro Gly Asn Val Gly Leu Met Asp Gln
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Val Glu Ala Leu Lys Trp Val Lys Asn Asn Ile Ala Ser Phe Gly Gly
 165 170 175

Asp Pro Asn Asn Val Thr Ile Phe Gly Glu Ser Ala Gly Gly Ala Ser
 180 185 190

Val His Tyr Leu Met Leu Ser Asp Leu Ser Lys Gly Leu Phe His Lys
 195 200 205

Ala Ile Ser Gln Ser Gly Ser Ala Phe Asn Pro Trp Ala Leu Gln His
 210 215 220

Asp Asn Asn Lys Glu Asn Ala Phe Arg Leu Cys Lys Leu Leu Gly His
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Pro Val Asp Asn Glu Thr Glu Ala Leu Lys Ile Leu Arg Gln Ala Pro
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Ile Asp Asp Leu Ile Asp Asn Arg Ile Lys Pro Lys Asp Lys Gly Gln
260 265 270

Leu Ile Ile Asp Tyr Pro Phe Leu Pro Thr Ile Glu Lys Arg Tyr Gln
275 280 285

Asn Phe Glu Pro Phe Leu Asp Gln Ser Pro Leu Ser Lys Met Gln Ser
290 295 300

Gly Asn Phe Thr Lys Val Pro Phe Ile Cys Gly Tyr Asn Ser Ala Glu
305 310 315 320

Gly Ile Leu Gly Leu Met Asp Phe Lys Asp Asp Pro Asn Ile Phe Glu
325 330 335

Lys Phe Glu Ala Asp Phe Glu Arg Phe Val Pro Val Asp Leu Asn Leu
340 345 350

Thr Leu Arg Ser Lys Glu Ser Lys Lys Leu Ala Glu Glu Met Arg Lys
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Phe Tyr Tyr Gln Asp Glu Pro Val Ser Ser Asp Asn Lys Glu Lys Phe
370 375 380

Val Ser Val Ile Ser Asp Thr Trp Phe Leu Arg Gly Ile Lys Asn Thr
385 390 395 400

Ala Arg Tyr Ile Ile Glu His Ser Ser Glu Pro Leu Tyr Leu Tyr Val
405 410 415

Tyr Ser Phe Asp Asp Phe Gly Phe Leu Lys Lys Leu Val Leu Asp Pro
420 425 430

Asn Ile Glu Gly Ala Ala His Gly Asp Glu Leu Gly Tyr Leu Phe Lys
435 440 445

Met Ser Phe Thr Glu Phe Pro Lys Asp Leu Pro Ser Ala Val Val Asn
450 455 460

Arg Glu Arg Leu Leu Gln Leu Trp Thr Asn Phe Ala Lys Thr Gly Asn
465 470 475 480

Pro Thr Pro Glu Ile Asn Asp Val Ile Thr Thr Lys Trp Asp Lys Ala
485 490 495

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Thr Glu Glu Lys Ser Asp His Met Asp Ile Asp Asn Thr Leu Arg Met
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Ile Pro Asp Pro Asp Ala Lys Arg Leu Arg Phe Trp Asn Lys Phe Leu
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<213> Ctenocephalides felis

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<210> 47


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<220>
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1 5 10 15
gag caa att agt gaa aaa gga aat gtg ttc cat agt tat tct gga att
96

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Val	His	Tyr	Leu	Met	Leu	Ser	Asp	Leu	Ser	Lys	Gly	Leu	Phe	His	Lys	
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<212> DNA

<213> Ctenocephalides felis

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tgtgaaattg cctgattgca tttttgataa tggagactgg tccaagaatg gttcaaaatt      720
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agcttctgtc tegtattcga caggatgacc cagaagtttg cagaggcgga atgcattttc      900
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ttttacccat tttagagctt caacctgggt catcaaacca acattgccag gcgcttcttc     1140
tattcccagg ttcaaaaatc ccaaaacacc taatcgataa ttgaaagtaa ccagaacaat     1200
tccataatcc atcaaatatt caggaccata catatcata tttccagatc ccatgaagaa     1260
gcctcctcca tgtatccata ccattactgg aagaagtgat ttctctgatg tttttggtac     1320
atagacattg aggtataaac aatcttcagc ccctacttta atttttttta taaaatgtac     1380
tgatctacaa ctattccctt ctttactagc atcaagaaca cctgaccaag gttctgcagg     1440
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<210> 53

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<212> PRT

<213> Ctenocephalides felis

<400> 53

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 20 25 30

Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Pro Pro Gln Lys
 35 40 45

Ala Glu Pro Trp Asn Gly Val Phe Asn Ala Thr Ser His Gly Asn Val
 50 55 60

Cys Lys Ala Leu Asn Phe Phe Leu Lys Lys Ile Glu Gly Asp Glu Asp
 65 70 75 80

Cys Leu Leu Val Asn Val Tyr Ala Pro Lys Thr Thr Ser Asp Lys Lys
 85 90 95

Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe Val Thr Gly Ser
 100 105 110

Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val Asn Tyr Asp Val
 115 120 125

Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu Gly Phe Leu Asn
 130 135 140

Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu Leu Asp Gln Val
 145 150 155 160

Ala Ala Leu Lys Trp Thr Lys Glu Asn Ile Glu Lys Phe Gly Gly Asp
 165 170 175

Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly Gly Ala Ser Val
 180 185 190

His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu Tyr Lys Arg Ala
 195 200 205

Ile Ala Gln Ser Gly Ser Ala Leu Asn Pro Trp Ala Phe Gln Arg His
 210 215 220

Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu Gly His Pro Thr
 225 230 235 240

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Asn	Asn	Thr	Gln	Asp	Ala	Leu	Glu	Phe	Leu	Gln	Lys	Ala	Pro	Val	Asp		
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Glu	Phe	Val	Phe	Val	Pro	Ser	Ile	Glu	Lys	Val	Phe	Pro	Ser	His	Gln		
		275					280					285					
Pro	Phe	Leu	Glu	Glu	Ser	Pro	Leu	Ala	Arg	Met	Lys	Ser	Gly	Ser	Phe		
	290					295					300						
Asn	Lys	Val	Pro	Leu	Leu	Val	Gly	Phe	Asn	Ser	Ala	Glu	Gly	Leu	Leu		
305					310					315					320		
Tyr	Lys	Phe	Phe	Met	Lys	Glu	Lys	Pro	Glu	Met	Leu	Asn	Gln	Ala	Glu		
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Ala	Asp	Phe	Glu	Arg	Leu	Val	Pro	Ala	Glu	Phe	Glu	Leu	Ala	His	Gly		
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Ser	Glu	Glu	Ser	Lys	Lys	Leu	Ala	Glu	Lys	Ile	Arg	Lys	Phe	Tyr	Phe		
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Asp	Asp	Lys	Pro	Val	Pro	Glu	Asn	Glu	Gln	Lys	Phe	Ile	Asp	Leu	Ile		
	370					375					380						
Gly	Asp	Ile	Trp	Phe	Thr	Arg	Gly	Ile	Asp	Lys	His	Val	Lys	Leu	Ser		
385					390					395					400		
Val	Glu	Lys	Gln	Asp	Glu	Pro	Val	Tyr	Tyr	Tyr	Glu	Tyr	Ser	Phe	Ser		
				405					410					415			
Glu	Ser	His	Pro	Ala	Lys	Gly	Thr	Phe	Gly	Asp	His	Asn	Leu	Thr	Gly		
			420					425					430				
Ala	Cys	His	Gly	Glu	Glu	Leu	Val	Asn	Leu	Phe	Lys	Val	Glu	Met	Met		
		435					440					445					
Lys	Leu	Glu	Lys	Asp	Lys	Pro	Asn	Val	Leu	Leu	Thr	Lys	Asp	Arg	Val		
	450					455					460						
Leu	Ala	Met	Trp	Thr	Asn	Phe	Ile	Lys	Asn	Gly	Asn	Pro	Thr	Pro	Glu		
465					470					475					480		
Val	Thr	Glu	Leu	Leu	Pro	Val	Lys	Trp	Glu	Pro	Ala	Thr	Lys	Asp	Lys		
				485					490					495			

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Leu Asn Tyr Leu Asn Ile Asp Ala Thr Leu Thr Leu Gly Thr Asn Pro
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Glu Glu Thr Arg Val Lys Phe Trp Glu Asp Ala Thr Lys Thr Leu His
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Ser Gln
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<212> PRT
<213> Ctenocephalides felis

<400> 54

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Thr Glu Gly Lys Pro Phe Arg Tyr Lys Asp His Arg Asn Asp Val Tyr
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Cys Ser Tyr Leu Gly Ile Pro Tyr Ala Glu Pro Pro Phe Gly Pro Leu
35 40 45

Arg Phe Gln Ser Pro Lys Pro Ile Ser Asn Pro Lys Thr Gly Phe Val
50 55 60

Gln Ala Arg Thr Leu Gly Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr
65 70 75 80

Ser Tyr Ala Gly Ser Glu Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro
85 90 95

Glu Thr Val Asn Ser Ala Asn Asn Thr Lys Tyr Pro Val Met Phe Trp
100 105 110

Ile His Gly Gly Ala Phe Asn Gln Gly Ser Gly Ser Tyr Asn Phe Phe
115 120 125

Gly Pro Asp Tyr Leu Ile Arg Glu Gly Ile Ile Leu Val Thr Ile Asn
130 135 140

Tyr Arg Leu Gly Val Phe Gly Phe Leu Ser Ala Pro Glu Trp Asp Ile
145 150 155 160

His Gly Asn Met Gly Leu Lys Asp Gln Arg Leu Ala Leu Lys Trp Val
165 170 175

Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Glu Lys Ile Thr Ile
Page 71

180

185

190

Ala Gly Glu Ser Ala Gly Ala Ala Ser Val His Phe Leu Met Met Asp
 195 200 205

Asn Ser Thr Arg Lys Tyr Tyr Gln Arg Ala Ile Leu Gln Ser Gly Thr
 210 215 220

Leu Leu Asn Pro Thr Ala Asn Gln Ile Gln Leu Leu His Arg Phe Glu
 225 230 235 240

Lys Leu Lys Gln Val Leu Asn Ile Thr Gln Lys Gln Glu Leu Leu Asn
 245 250 255

Leu Asp Lys Asn Leu Ile Leu Arg Ala Ala Leu Asn Arg Val Pro Asp
 260 265 270

Ser Asn Asp His Asp Arg Asp Thr Val Pro Val Phe Asn Pro Val Leu
 275 280 285

Glu Ser Pro Glu Ser Pro Asp Pro Ile Thr Phe Pro Ser Ala Leu Glu
 290 295 300

Arg Met Arg Asn Gly Glu Phe Pro Asp Val Asp Val Ile Ile Gly Phe
 305 310 315 320

Asn Ser Ala Glu Gly Leu Arg Ser Met Ala Arg Val Thr Arg Gly Asn
 325 330 335

Met Glu Val His Lys Thr Leu Thr Asn Ile Glu Arg Ala Ile Pro Arg
 340 345 350

Asp Ala Asn Ile Trp Lys Asn Pro Asn Gly Ile Glu Glu Lys Lys Leu
 355 360 365

Ile Lys Met Leu Thr Glu Phe Tyr Asp Gln Val Lys Glu Gln Asn Asp
 370 375 380

Asp Ile Glu Ala Tyr Val Gln Leu Lys Gly Asp Ala Gly Tyr Leu Gln
 385 390 395 400

Gly Ile Tyr Arg Thr Leu Lys Ala Ile Phe Phe Asn Glu Phe Arg Arg
 405 410 415

Asn Ser Asn Leu Tyr Leu Tyr Arg Leu Ser Asp Asp Thr Tyr Ser Val
 420 425 430

Tyr Lys Ser Tyr Ile Leu Pro Tyr Arg Trp Gly Ser Leu Pro Gly Val
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435

440

445

Ser His Gly Asp Asp Leu Gly Tyr Leu Phe Ala Asn Ser Leu Asp Val
 450 455 460

Pro Ile Leu Gly Thr Thr His Ile Ser Ile Pro Gln Asp Ala Met Gln
 465 470 475 480

Thr Leu Glu Arg Met Val Arg Ile Trp Thr Asn Phe Val Lys Asn Gly
 485 490 495

Lys Pro Thr Ser Asn Thr Glu Asp Ala Ser Cys Asp Thr Lys Arg His
 500 505 510

Leu Asn Asp Ile Phe Trp Glu Pro Tyr Asn Asp Glu Glu Pro Lys Tyr
 515 520 525

Leu Asp Met Gly Lys Glu Asn Phe Glu Met Lys Asn Ile Leu Glu Leu
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Lys Arg Met Met Leu Trp Asp Glu Val Tyr Arg Asn Ala Asn Leu Arg
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Phe Arg Val Cys Asn Glu Gly Ser Ile Arg
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<210> 55

<211> 570

<212> PRT

<213> Ctenocephalides felis

<400> 55

Trp Asp Asn Leu Asp Gln His Leu Cys Arg Val Gln Phe Asn Gly Ile
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 20 25 30

Cys Ser Tyr Leu Gly Ile Pro Tyr Ala Glu Pro Pro Ile Gly Pro Leu
 35 40 45

Arg Phe Gln Ser Pro Lys Pro Ile Ser Asn Pro Lys Thr Gly Phe Val
 50 55 60

Gln Ala Arg Ser Leu Gly Asp Lys Cys Phe Gln Glu Ser Leu Ile Tyr
 65 70 75 80

Ser Tyr Ala Gly Ser Glu Asp Cys Leu Tyr Leu Asn Ile Phe Thr Pro
 85 90 95

Glu	Thr	Val	Asn	Ser	Ala	Asn	Asn	Thr	Lys	Tyr	Pro	Val	Met	Phe	Trp
			100					105					110		
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		115					120					125			
Gly	Pro	Asp	Tyr	Leu	Ile	Arg	Glu	Gly	Ile	Ile	Leu	Val	Thr	Ile	Asn
	130					135					140				
Tyr	Arg	Leu	Gly	Val	Phe	Gly	Phe	Leu	Ser	Ala	Pro	Glu	Trp	Asp	Ile
145					150					155					160
His	Gly	Asn	Met	Gly	Leu	Lys	Asp	Gln	Arg	Leu	Ala	Leu	Lys	Trp	Val
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Tyr	Asp	Asn	Ile	Glu	Lys	Phe	Gly	Gly	Asp	Arg	Asp	Lys	Ile	Thr	Ile
			180					185					190		
Ala	Gly	Glu	Ser	Ala	Gly	Ala	Ala	Ser	Val	His	Phe	Leu	Met	Met	Asp
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Asn	Ser	Thr	Arg	Lys	Tyr	Tyr	Gln	Arg	Ala	Ile	Leu	Gln	Ser	Gly	Thr
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Leu	Leu	Asn	Pro	Thr	Ala	Asn	Gln	Ile	Gln	Pro	Leu	His	Arg	Phe	Glu
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Lys	Leu	Lys	Gln	Val	Leu	Asn	Ile	Thr	Gln	Lys	Gln	Glu	Leu	Leu	Asn
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			260					265					270		
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		275					280					285			
Glu	Ser	Pro	Glu	Ser	Pro	Asp	Pro	Ile	Thr	Phe	Pro	Ser	Ala	Leu	Glu
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Arg	Met	Arg	Asn	Gly	Glu	Phe	Pro	Asp	Val	Asp	Val	Ile	Ile	Gly	Phe
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Asn	Ser	Ala	Glu	Gly	Leu	Arg	Ser	Met	Pro	Arg	Val	Thr	Arg	Gly	Asn
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Met	Glu	Val	Tyr	Lys	Thr	Leu	Thr	Asn	Ile	Glu	Arg	Ala	Ile	Pro	Arg
			340					345					350		

Asp Ala Asn Ile Trp Lys Asn Pro Asn Gly Ile Glu Glu Lys Lys Leu
355 360 365

Ile Lys Met Leu Thr Glu Phe Tyr Asp Gln Val Lys Glu Gln Asn Asp
370 375 380

Asp Ile Glu Ala Tyr Val Gln Leu Lys Gly Asp Ala Gly Tyr Leu Gln
385 390 395 400

Gly Ile Tyr Arg Thr Leu Lys Ala Ile Phe Phe Asn Glu Ile Lys Arg
405 410 415

Asn Ser Asn Leu Tyr Leu Tyr Arg Leu Ser Asp Asp Thr Tyr Ser Val
420 425 430

Tyr Lys Ser Tyr Ile Leu Pro Tyr Arg Trp Gly Ser Leu Pro Gly Val
435 440 445

Ser His Gly Asp Asp Leu Gly Tyr Leu Phe Ala Asn Ser Leu Asp Val
450 455 460

Pro Ile Leu Gly Thr Thr His Ile Ser Ile Pro Gln Asp Ala Met Gln
465 470 475 480

Thr Leu Glu Arg Met Val Arg Ile Trp Thr Asn Phe Val Lys Asn Gly
485 490 495

Lys Pro Thr Ser Asn Thr Glu Asp Ala Ser Cys Asp Thr Lys Arg His
500 505 510

Leu Asn Asp Ile Phe Trp Glu Pro Tyr Asn Asp Glu Glu Pro Lys Tyr
515 520 525

Leu Asp Met Gly Lys Glu His Phe Glu Met Lys Asn Ile Leu Glu Leu
530 535 540

Lys Arg Met Met Leu Trp Asp Glu Val Tyr Arg Asn Ala Asn Leu Arg
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Phe Arg Val Cys Asn Glu Gly Ser Ile Arg
565 570

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<211> 20

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

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<210> 57

<211> 2144

<212> DNA

<213> Ctenocephalides felis

<220>

<221> CDS

<222> (30)..(1682)

<223>

<220>

<221> misc_feature

<222> (462)..(462)

<223> At nucleotide 462, r = a or g

At amino acid residue 145, Xaa = Asn or Asp

<400> 57

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Cys Ile Phe Leu Phe Ser Phe Asn Phe Ile Lys Cys Asp Ser Pro Thr	
10 15 20	

gta act ttg ccc caa ggc gaa ttg gtt gga aaa gct ttg acg aac gaa	149
Val Thr Leu Pro Gln Gly Glu Leu Val Gly Lys Ala Leu Thr Asn Glu	
25 30 35 40	

aat gga aaa gag tat ttt agc tac aca ggt gta cct tat gct aaa cct	197
Asn Gly Lys Glu Tyr Phe Ser Tyr Thr Gly Val Pro Tyr Ala Lys Pro	
45 50 55	

cct gtt gga gaa ctt aga ttt aag cct cca cag aaa gct gag cca tgg	245
Pro Val Gly Glu Leu Arg Phe Lys Pro Pro Gln Lys Ala Glu Pro Trp	
60 65 70	

caa ggt gtt ttc aac gcc aca tta tac gga aat gtg tgt aaa tct tta	293
Gln Gly Val Phe Asn Ala Thr Leu Tyr Gly Asn Val Cys Lys Ser Leu	
75 80 85	

aat ttc ttc ttg aag aaa att gaa gga gac gaa gac tgc ttg gta gta	341
Asn Phe Phe Leu Lys Lys Ile Glu Gly Asp Glu Asp Cys Leu Val Val	
90 95 100	

aac gtg tac gca cca aaa aca act tct gat aaa aaa ctt cca gta ttt	389
Asn Val Tyr Ala Pro Lys Thr Thr Ser Asp Lys Lys Leu Pro Val Phe	
105 110 115 120	

ttc tgg gtt cat ggt ggt ggt ttt gtg act gga tcc gga aat tta gaa	437
Phe Trp Val His Gly Gly Gly Phe Val Thr Gly Ser Gly Asn Leu Glu	
125 130 135	

ttc caa agc cca gat tat tta gta rat ttt gat gtt att ttc gta act	485
Phe Gln Ser Pro Asp Tyr Leu Val Xaa Phe Asp Val Ile Phe Val Thr	
140 145 150	

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155 160 165	
ggt gct cca gga aat gta gga tta ttg gat cag gtg gca gct ctg aaa	581
Gly Ala Pro Gly Asn Val Gly Leu Leu Asp Gln Val Ala Ala Leu Lys	
170 175 180	
tgg acc aaa gaa aac att gag aaa ttt ggt gga gat cca gaa aat att	629
Trp Thr Lys Glu Asn Ile Glu Lys Phe Gly Gly Asp Pro Glu Asn Ile	
185 190 195 200	
aca att ggt ggt gtt tct gct ggt gga gca agt gtt cat tat ctt ttg	677
Thr Ile Gly Gly Val Ser Ala Gly Gly Ala Ser Val His Tyr Leu Leu	
205 210 215	
tta tct cat aca acc act gga ctt tac aaa agg gca att gct caa agt	725
Leu Ser His Thr Thr Thr Gly Leu Tyr Lys Arg Ala Ile Ala Gln Ser	
220 225 230	
gga agt gct ttt aat cca tgg gcc ttc caa aga cat cca gta aag cgt	773
Gly Ser Ala Phe Asn Pro Trp Ala Phe Gln Arg His Pro Val Lys Arg	
235 240 245	
agt ctt caa ctt gct gag ata ttg ggt cat ccc aca aac aat act caa	821
Ser Leu Gln Leu Ala Glu Ile Leu Gly His Pro Thr Asn Asn Thr Gln	
250 255 260	
gat gct tta gaa ttc tta caa aaa gcc ccc gta gac agt ctc ctg aag	869
Asp Ala Leu Glu Phe Leu Gln Lys Ala Pro Val Asp Ser Leu Leu Lys	
265 270 275 280	
aaa atg cca gct gaa aca gaa ggt gaa ata ata gaa gag ttt gtc ttc	917
Lys Met Pro Ala Glu Thr Glu Gly Glu Ile Ile Glu Glu Phe Val Phe	
285 290 295	
gta cca tca att gaa aaa gtt ttc cca tcc cac caa cct ttc ttg gaa	965
Val Pro Ser Ile Glu Lys Val Phe Pro Ser His Gln Pro Phe Leu Glu	
300 305 310	
gaa tca cca ttg gcc aga atg aaa tcc gga tcc ttt aac aaa gta cct	1013
Glu Ser Pro Leu Ala Arg Met Lys Ser Gly Ser Phe Asn Lys Val Pro	
315 320 325	
tta tta gtt gga ttt aac agt gca gaa gga ctt ttg ttc aaa ttc ttc	1061
Leu Leu Val Gly Phe Asn Ser Ala Glu Gly Leu Leu Phe Lys Phe Phe	
330 335 340	
atg aaa gaa aaa cca gag atg ctg aac caa gct gaa gca gat ttt gaa	1109
Met Lys Glu Lys Pro Glu Met Leu Asn Gln Ala Glu Ala Asp Phe Glu	
345 350 355 360	
aga ctc gta cca gcc gaa ttt gaa tta gtc cat gga tca gag gaa tcg	1157
Arg Leu Val Pro Ala Glu Phe Glu Leu Val His Gly Ser Glu Glu Ser	
365 370 375	
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Lys Lys Leu Ala Glu Lys Ile Arg Lys Phe Tyr Phe Asp Asp Lys Pro	
380 385 390	
gtt cca gaa aat gaa cag aaa ttt att gac ttg ata gga gat att tgg	1253
Val Pro Glu Asn Glu Gln Lys Phe Ile Asp Leu Ile Gly Asp Ile Trp	
395 400 405	

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410 415 420	
gac gaa cca gtt tat tat tat gaa tat tcc ttc tcg gaa agt cat cct	1349
Asp Glu Pro Val Tyr Tyr Tyr Glu Tyr Ser Phe Ser Glu Ser His Pro	
425 430 435 440	
gca aaa gga aca ttt ggt gat cat aat ctg act ggt gca tgc cat gga	1397
Ala Lys Gly Thr Phe Gly Asp His Asn Leu Thr Gly Ala Cys His Gly	
445 450 455	
gaa gaa ctt gtg aat tta ttc aaa gtc gag atg atg aag ctg gaa aaa	1445
Glu Glu Leu Val Asn Leu Phe Lys Val Glu Met Met Lys Leu Glu Lys	
460 465 470	
gat aaa cct aat gtt cta tta aca aaa gat aga gta ctt gcc atg tgg	1493
Asp Lys Pro Asn Val Leu Leu Thr Lys Asp Arg Val Leu Ala Met Trp	
475 480 485	
act aac ttc atc aaa aat gga aat cct act cct gaa gta aca gaa tta	1541
Thr Asn Phe Ile Lys Asn Gly Asn Pro Thr Pro Glu Val Thr Glu Leu	
490 495 500	
ttg cca gtt aaa tgg gaa cct gcc aca aaa gac aag ttg aat tat ttg	1589
Leu Pro Val Lys Trp Glu Pro Ala Thr Lys Asp Lys Leu Asn Tyr Leu	
505 510 515 520	
aac att gat gcc acc tta act ttg gga aca aat cct gag gca aac cga	1637
Asn Ile Asp Ala Thr Leu Thr Leu Gly Thr Asn Pro Glu Ala Asn Arg	
525 530 535	
gtc aaa ttt tgg gaa gac gcc aca aaa tct ttg cac ggt caa taa	1682
Val Lys Phe Trp Glu Asp Ala Thr Lys Ser Leu His Gly Gln	
540 545 550	
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aataacaatt tttatgtttt atgtattggc ttatgtgtat cagttctaata tttatttatt	1802
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tttaaagaaa ataccaaaaa taaagtaaaa ttccaaacgg aattttttgtt taacttaaaa	2042
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<210> 58
 <211> 550
 <212> PRT
 <213> Ctenocephalides felis

 <220>
 <221> misc_feature
 <222> (145)..(145)
 <223> The 'Xaa' at location 145 stands for Asp, or Asn.

<400> 58

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          35          40          45

Thr Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys
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Pro Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn Ala Thr Leu
65          70          75          80

Tyr Gly Asn Val Cys Lys Ser Leu Asn Phe Phe Leu Lys Lys Ile Glu
          85          90          95

Gly Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro Lys Thr Thr
          100          105          110

Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe
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Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val
130          135          140

Xaa Phe Asp Val Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu
145          150          155          160

Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu
          165          170          175

Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu Asn Ile Glu Lys
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Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly
          195          200          205

Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu
          210          215          220

Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Phe Asn Pro Trp Ala
225          230          235          240

Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu
          245          250          255

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Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe Leu Gln Lys
 260 265 270
 Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala Glu Thr Glu Gly
 275 280 285
 Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile Glu Lys Val Phe
 290 295 300
 Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala Arg Met Lys
 305 310 315 320
 Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala
 325 330 335
 Glu Gly Leu Leu Phe Lys Phe Phe Met Lys Glu Lys Pro Glu Met Leu
 340 345 350
 Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala Glu Phe Glu
 355 360 365
 Leu Val His Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu Lys Ile Arg
 370 375 380
 Lys Phe Tyr Phe Asp Asp Lys Pro Val Pro Glu Asn Glu Gln Lys Phe
 385 390 395 400
 Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly Val Asp Lys His
 405 410 415
 Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu
 420 425 430
 Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe Gly Asp His
 435 440 445
 Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn Leu Phe Lys
 450 455 460
 Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn Val Leu Leu Thr
 465 470 475 480
 Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys Asn Gly Asn
 485 490 495
 Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala
 500 505 510

Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr Leu Thr Leu
515 520 525

Gly Thr Asn Pro Glu Ala Asn Arg Val Lys Phe Trp Glu Asp Ala Thr
530 535 540

Lys Ser Leu His Gly Gln
545 550

<210> 59
<211> 2144
<212> DNA
<213> Ctenocephalides felis

<400> 59
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cagaaatact aattatcaaa attattgaag agttaatttt atttttaagt taaacaaaaa 120
ttccgtttgg aattttactt tatttttgggt attttcttta aaaaaaatta ttgaaaatat 180
cttatatttt tagttaatgt atttttactg atttttagtgt atatataaaa atacttcaga 240
gtacttaata taacatatct attggaaatt ttgctaaaaa caaacgacgt tgtgttttga 300
aaattaaac catgatattt caaaacaagc aaaacaagaa taaataaata aaattagaac 360
tgatacacat aagccaatac ataaaacata aaaattgtta ttttttaatt tttatttacc 420
taatataatta cctaaagtat ttaaaacaat tttcataaat tattattgac cgtgcaaaga 480
ttttgtggcg tcttcccaa atttgactcg gtttgccctca ggatttggtc ccaaagttaa 540
ggtggcatca atgttcaa atttcaactt gtcttttgtg gcagggtccc atttaactgg 600
caataattct gttacttcag gagtaggatt tccatttttg atgaagttag tccacatggc 660
aagtactcta tcttttggtta atagaacatt aggtttatct ttttccagct tcatcatctc 720
gactttgaat aaattcacia gttcttctcc atggcatgca ccagtcagat tatgatcacc 780
aatgttcct tttgcaggat gactttccga gaaggaatat tcataataat aaactgggtc 840
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tcctatcaag tcaataaatt tctgttcatt ttctggaacg ggtttatcgt caaagtaaaa 960
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catgaagaat ttgaacaaaa gtccttctgc actgttaa at ccaactaata aagggtacttt 1140
gttaaaggat ccggatttca ttctggccaa tgggtgattct tccaagaaag gttgggtggga 1200
tgggaaaact ttttcaattg atggtacgaa gacaaaactct tctattattt caccttctgt 1260
ttcagctggc attttcttca ggagactgtc tacggggggt ttttgtaaga attctaaagc 1320

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atcttgagta ttgtttgtgg gatgacccaa tatctcagca agttgaagac tacgctttac 1380
tggatgtcctt tggaaggccc atggattaaa agcacttcca ctttgagcaa ttgccctttt 1440
gtaaagtcca gtggttgtat gagataacaa aagataatga acacttgctc caccagcaga 1500
aacaccacca attgtaatat tttctggatc tccaccaaat ttctcaatgt tttctttggg 1560
ccatttcaga gctgccacct gatccaataa tcctacattt cctggagcac cctccaactc 1620
caaattcaga aatccgagag gtcccaatcg gtaattgaaa gttacgaaaa taacatcaaa 1680
atytactaaa taatctgggc tttggaattc taaatttccg gatccagtca caaaaccacc 1740
accatgaacc cagaaaaata ctggaagttt tttatcagaa gttgtttttg gtgcgtacac 1800
gtttactacc aagcagtctt cgtctccttc aattttcttc aagaagaaat ttaaagattt 1860
acacacattt ccgtataatg tggcgttgaa aacaccttgc catggctcag ctttctgtgg 1920
aggcttaaat ctaagttctc caacaggagg tttagcataa ggtacacctg tgtagctaaa 1980
atactctttt ccattttcgt tcgtcaaagc ttttccaacc aattcgcctt ggggcaaagt 2040
tacagtcggg gaatcacatt ttataaaatt aaaactaaac aaaaaaatac aacttaaaaa 2100
aataacacga gacatcttgg atctagacta ttgactatgt gtac 2144

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<210> 60
<211> 1650
<212> DNA
<213> Ctenocephalides felis

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<220>
<221> exon
<222> (1)..(1650)
<223>

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<220>
<221> misc_feature
<222> (433)..(433)
<223> At nucleotide 433, r = a or g
      At amino acid residue 145, Xaa = Asn or Asp

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<400> 60
atg tct cgt gtt att ttt tta agt tgt att ttt ttg ttt agt ttt aat 48
Met Ser Arg Val Ile Phe Leu Ser Cys Ile Phe Leu Phe Ser Phe Asn
1 5 10 15

ttt ata aaa tgt gat tcc ccg act gta act ttg ccc caa ggc gaa ttg 96
Phe Ile Lys Cys Asp Ser Pro Thr Val Thr Leu Pro Gln Gly Glu Leu
20 25 30

gtt gga aaa gct ttg acg aac gaa aat gga aaa gag tat ttt agc tac 144
Val Gly Lys Ala Leu Thr Asn Glu Asn Gly Lys Glu Tyr Phe Ser Tyr
35 40 45

aca ggt gta cct tat gct aaa cct cct gtt gga gaa ctt aga ttt aag 192
Thr Gly Val Pro Tyr Ala Lys Pro Pro Val Gly Glu Leu Arg Phe Lys
50 55 60

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cct cca cag aaa gct gag cca tgg caa ggt gtt ttc aac gcc aca tta	240
Pro Pro Gln Lys Ala Glu Pro Trp Gln Gly Val Phe Asn Ala Thr Leu	
65 70 75 80	
tac gga aat gtg tgt aaa tct tta aat ttc ttc ttg aag aaa att gaa	288
Tyr Gly Asn Val Cys Lys Ser Leu Asn Phe Ser Pro Lys Lys Ile Glu	
85 90 95	
gga gac gaa gac tgc ttg gta gta aac gtg tac gca cca aaa aca act	336
Gly Asp Glu Asp Cys Leu Val Val Asn Val Tyr Ala Pro Lys Thr Thr	
100 105 110	
tct gat aaa aaa ctt cca gta ttt ttc tgg gtt cat ggt ggt ggt ttt	384
Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val His Gly Gly Gly Phe	
115 120 125	
gtg act gga tcc gga aat tta gaa ttc caa agc cca gat tat tta gta	432
Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser Pro Asp Tyr Leu Val	
130 135 140	
rat ttt gat gtt att ttc gta act ttc aat tac cga ttg gga cct ctc	480
Xaa Phe Asp Val Ile Phe Val Thr Phe Asn Tyr Arg Leu Gly Pro Leu	
145 150 155 160	
gga ttt ctg aat ttg gag ttg gag ggt gct cca gga aat gta gga tta	528
Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro Gly Asn Val Gly Leu	
165 170 175	
ttg gat cag gtg gca gct ctg aaa tgg acc aaa gaa aac att gag aaa	576
Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys Glu Asn Ile Glu Lys	
180 185 190	
ttt ggt gga gat cca gaa aat att aca att ggt ggt gtt tct gct ggt	624
Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly Gly Val Ser Ala Gly	
195 200 205	
gga gca agt gtt cat tat ctt ttg tta tct cat aca acc act gga ctt	672
Gly Ala Ser Val His Tyr Leu Leu Leu Ser His Thr Thr Thr Gly Leu	
210 215 220	
tac aaa agg gca att gct caa agt gga agt gct ttt aat cca tgg gcc	720
Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala Phe Asn Pro Trp Ala	
225 230 235 240	
ttc caa aga cat cca gta aag cgt agt ctt caa ctt gct gag ata ttg	768
Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln Leu Ala Glu Ile Leu	
245 250 255	
ggt cat ccc aca aac aat act caa gat gct tta gaa ttc tta caa aaa	816
Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu Glu Phe Leu Gln Lys	
260 265 270	
gcc ccc gta gac agt ctc ctg aag aaa atg cca gct gaa aca gaa ggt	864
Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro Ala Glu Thr Glu Gly	
275 280 285	
gaa ata ata gaa gag ttt gtc ttc gta cca tca att gaa aaa gtt ttc	912
Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser Ile Glu Lys Val Phe	
290 295 300	
cca tcc cac caa cct ttc ttg gaa gaa tca cca ttg gcc aga atg aaa	960
Pro Ser His Gln Pro Phe Leu Glu Glu Ser Pro Leu Ala Arg Met Lys	
305 310 315 320	

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tcc gga tcc ttt aac aaa gta cct tta tta gtt gga ttt aac agt gca	1008
Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val Gly Phe Asn Ser Ala	
325 330 335	
gaa gga ctt ttg ttc aaa ttc ttc atg aaa gaa aaa cca gag atg ctg	1056
Glu Gly Leu Phe Lys Phe Phe Met Lys Glu Lys Pro Glu Met Leu	
340 345 350	
aac caa gct gaa gca gat ttt gaa aga ctc gta cca gcc gaa ttt gaa	1104
Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val Pro Ala Glu Phe Glu	
355 360 365	
tta gtc cat gga tca gag gaa tcg aaa aaa ctt gca gaa aaa atc agg	1152
Leu Val His Gly Ser Glu Glu Ser Lys Lys Leu Ala Glu Lys Ile Arg	
370 375 380	
aag ttt tac ttt gac gat aaa ccc gtt cca gaa aat gaa cag aaa ttt	1200
Lys Phe Tyr Phe Asp Asp Lys Pro Val Pro Glu Asn Glu Gln Lys Phe	
385 390 395 400	
att gac ttg ata gga gat att tgg ttt act aga ggt gtt gac aag cat	1248
Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg Gly Val Asp Lys His	
405 410 415	
gtc aag ttg tct gtg gag aaa caa gac gaa cca gtt tat tat tat gaa	1296
Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro Val Tyr Tyr Tyr Glu	
420 425 430	
tat tcc ttc tcg gaa agt cat cct gca aaa gga aca ttt ggt gat cat	1344
Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly Thr Phe Gly Asp His	
435 440 445	
aat ctg act ggt gca tgc cat gga gaa gaa ctt gtg aat tta ttc aaa	1392
Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu Val Asn Leu Phe Lys	
450 455 460	
gtc gag atg atg aag ctg gaa aaa gat aaa cct aat gtt cta tta aca	1440
Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro Asn Val Leu Leu Thr	
465 470 475 480	
aaa gat aga gta ctt gcc atg tgg act aac ttc atc aaa aat gga aat	1488
Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe Ile Lys Asn Gly Asn	
485 490 495	
cct act cct gaa gta aca gaa tta ttg cca gtt aaa tgg gaa cct gcc	1536
Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val Lys Trp Glu Pro Ala	
500 505 510	
aca aaa gac aag ttg aat tat ttg aac att gat gcc acc tta act ttg	1584
Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp Ala Thr Leu Thr Leu	
515 520 525	
gga aca aat cct gag gca aac cga gtc aaa ttt tgg gaa gac gcc aca	1632
Gly Thr Asn Pro Glu Ala Asn Arg Val Lys Phe Trp Glu Asp Ala Thr	
530 535 540	
aaa tct ttg cac ggt caa	1650
Lys Ser Leu His Gly Gln	
545 550	

<210> 61
 <211> 1650
 <212> DNA

<213> Ctenocephalides felis

<400> 61

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ttgaccgtgc aaagattttg tggcgtcttc ccaaaatttg actcggtttg cctcaggatt      60
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ttcccattta actggcaata attctgttac ttcaggagta ggatttccat ttttgatgaa      180
gttagtccac atggcaagta ctctatcttt tgttaataga acattagggt tatctttttc      240
cagcttcac atctcgactt tgaataaatt cacaagttct tctccatggc atgcaccagt      300
cagattatga tcaccaaag ttccttttgc aggatgactt tccgagaagg aatattcata      360
ataataaaact ggttcgtctt gtttctccac agacaacttg acatgcttgt caacacctct      420
agtaaacc aaatctccta tcaagtcaat aaatttctgt tcattttctg gaacgggttt      480
atcgtcaaag taaaacttcc tgattttttc tgcaagtttt ttcgattcct ctgatccatg      540
gactaattca aattcggctg gtacgagtct ttcaaaatct gcttcagctt ggttcagcat      600
ctctggtttt tctttcatga agaatttgaa caaaagtcct tctgcaactgt taaatccaac      660
taataaaggt actttgttaa aggatccgga tttcattctg gccaatggtg attcttccaa      720
gaaagggttg tgggatggga aaactttttc aattgatggt acgaagacaa actcttctat      780
tatttcacct tctgtttcag ctggcatttt cttcaggaga ctgtctacgg gggctttttg      840
taagaattct aaagcatctt gagtattggt tgtgggatga cccaatatct cagcaagttg      900
aagactacgc tttactggat gtctttggaa ggcccatgga ttaaaagcac ttccactttg      960
agcaattgcc cttttgtaaa gtccagtggg tgtatgagat aacaaaagat aatgaacact     1020
tgctccacca gcagaaacac caccaattgt aatattttct ggatctccac caaatttctc     1080
aatgttttct ttggtccatt tcagagctgc cacctgatcc aataatccta catttctctg     1140
agcaccctcc aactccaaat tcagaaatcc gagagggtccc aatcggtaat tgaaagttac     1200
gaaaataaca tcaaaatyta ctaaataatc tgggcttttg aattctaaat ttccggatcc     1260
agtcacaaaa ccaccacat gaaccagaa aaatactgga agttttttat cagaagttgt      1320
ttttggtgcg tacacgttta ctaccaagca gtcttcgtct ccttcaattt tcttcaagaa     1380
gaaatttaaa gatttacaca catttccgta taatgtggcg ttgaaaacac cttgccatgg     1440
ctcagctttc tgtggaggct taaatctaag ttctccaaca ggaggtttag cataaggtag     1500
acctgtgtag ctaaaatact cttttccatt ttcgttcgtc aaagcttttc caaccaattc     1560
gccttggggc aaagttacag tcggggaatc acattttata aaattaaaac taaacaaaaa     1620
aatacaactt aaaaaataa cagagacat                                     1650

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<210> 62

<211> 29

<212> DNA

<213> Artificial sequence

<220>
 <223> Synthetic Primer

 <400> 62
 aaactcgagt ccccgactg taactttgc 29

 <210> 63
 <211> 36
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic Primer

 <400> 63
 tcatctgcag ttattgactg tgcaaagttt ttgtgg 36

 <210> 64
 <211> 32
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic Primer

 <400> 64
 ttccggatcc ggctgatcta caagtgactt tg 32

 <210> 65
 <211> 34
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic Primer

 <400> 65
 tgggtactcga gtcataaaaaa tttattccaa aatc 34

 <210> 66
 <211> 39
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic Primer

 <400> 66
 aaaactgcag tataaatatg ttacctcaca gtgcattag 39

 <210> 67
 <211> 1987
 <212> DNA
 <213> Ctenocephalides felis

 <220>
 <221> CDS
 <222> (231)..(1820)

<223>

<400> 67

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aattcacagt gtaaataatt ttatttgata taaatgtatt taatttttat tttaattctaa      60
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aaatttttat ttatgtttat gagtgtgtgt tttggctatg atttacatta tttttgagct      180
agtataaaat taaaccatat tatattttgg atatataata acattttata atg tgt      236
                                   Met Cys
                                   1
gat cca tta cta aaa aca aca aca tat gga att ctg aaa ggc aag aaa      284
Asp Pro Leu Leu Lys Thr Thr Thr Tyr Gly Ile Leu Lys Gly Lys Lys
      5                               10                               15

ggt gta aac gaa aat ggt aaa att tac tat agt tac aca ggt ata ccc      332
Val Val Asn Glu Asn Gly Lys Ile Tyr Tyr Ser Tyr Thr Gly Ile Pro
      20                               25                               30

tat gca aaa tct cct gta aat gat ctc aga ttc aag cca cca caa aaa      380
Tyr Ala Lys Ser Pro Val Asn Asp Leu Arg Phe Lys Pro Pro Gln Lys
      35                               40                               45                               50

ctt gat cct tgg aat ggt gtt ttt gac gcc act cag tat gga aat aat      428
Leu Asp Pro Trp Asn Gly Val Phe Asp Ala Thr Gln Tyr Gly Asn Asn
      55                               60                               65

tgt gct gct ggg aaa tgg ttt ttg aaa tca gct ggg ggt tgc gaa gat      476
Cys Ala Ala Gly Lys Trp Phe Leu Lys Ser Ala Gly Gly Cys Glu Asp
      70                               75                               80

tgc ctt tac tta aat atc tat gtc cca caa aac act tca gaa aat cct      524
Cys Leu Tyr Leu Asn Ile Tyr Val Pro Gln Asn Thr Ser Glu Asn Pro
      85                               90                               95

ttg cca gta atg ttt tgg att cat gga gga gca ttt gtg gtc gga tca      572
Leu Pro Val Met Phe Trp Ile His Gly Gly Ala Phe Val Val Gly Ser
      100                              105                              110

gga aat tct gat ata cat ggt cct gat tat tta ata gaa tat gat att      620
Gly Asn Ser Asp Ile His Gly Pro Asp Tyr Leu Ile Glu Tyr Asp Ile
      115                              120                              125                              130

atc tta gta act att aat tat cgt cta gga cca ctt ggt ttt ctt aat      668
Ile Leu Val Thr Ile Asn Tyr Arg Leu Gly Pro Leu Gly Phe Leu Asn
      135                              140                              145

ttg gaa atc gaa gat gcg cct ggg aat gtt gga ttg atg gat caa gtt      716
Leu Glu Ile Glu Asp Ala Pro Gly Asn Val Gly Leu Met Asp Gln Val
      150                              155                              160

gca gcc cta aaa tgg gta aat gaa aat att gca acc ttt agt gga gac      764
Ala Ala Leu Lys Trp Val Asn Glu Asn Ile Ala Thr Phe Ser Gly Asp
      165                              170                              175

cca aaa aat att aca att tgt gga gca act gct gga gct gca agt gta      812
Pro Lys Asn Ile Thr Ile Cys Gly Ala Thr Ala Gly Ala Ala Ser Val
      180                              185                              190

cat tat cac att ttg tca caa ctt acc aaa ggt tta ttc cac aag gct      860
His Tyr His Ile Leu Ser Gln Leu Thr Lys Gly Leu Phe His Lys Ala

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195	200	205	210	
ata gca caa agt gga agt gct ttt aat ccc tgg gct ttc caa aaa aat				908
Ile Ala Gln Ser Gly Ser Ala Phe Asn Pro Trp Ala Phe Gln Lys Asn	215	220	225	
cct gtt aag aat gca ctt cga cta tgc aaa acc tta ggc ctt acc aca				956
Pro Val Lys Asn Ala Leu Arg Leu Cys Lys Thr Leu Gly Leu Thr Thr	230	235	240	
aac aac ctt caa gaa gcc ttg gat ttt ttg aaa aac cta cca gta gaa				1004
Asn Asn Leu Gln Glu Ala Leu Asp Phe Leu Lys Asn Leu Pro Val Glu	245	250	255	
aca ttg tta aat acc aaa tta ccc caa gaa att gat ggt caa ctg ctg				1052
Thr Leu Leu Asn Thr Lys Leu Pro Gln Glu Ile Asp Gly Gln Leu Leu	260	265	270	
gat gac ttc gtg ttt gta cct tcg att gaa aaa aca ttt cca gaa caa				1100
Asp Asp Phe Val Phe Val Pro Ser Ile Glu Lys Thr Phe Pro Glu Gln	275	280	285	290
gat tcg tac tta act gac ttg cca ata cca ata ata aat tca gga aaa				1148
Asp Ser Tyr Leu Thr Asp Leu Pro Ile Pro Ile Ile Asn Ser Gly Lys	295	300	305	
ttc cac aaa gtt cca ttg ttg aca ggt tac aac agt gcc gaa ggc aat				1196
Phe His Lys Val Pro Leu Leu Thr Gly Tyr Asn Ser Ala Glu Gly Asn	310	315	320	
cta ttt ttc atg tac tta aaa aca gat cca gat tta tta aat aaa ttt				1244
Leu Phe Phe Met Tyr Leu Lys Thr Asp Pro Asp Leu Leu Asn Lys Phe	325	330	335	
gaa gct gat ttt gaa aga ttt ata cca act gac tta gaa tta cct ttg				1292
Glu Ala Asp Phe Glu Arg Phe Ile Pro Thr Asp Leu Glu Leu Pro Leu	340	345	350	
cga tca caa aaa tct att gca ctg ggt gaa gca atc agg gaa ttt tat				1340
Arg Ser Gln Lys Ser Ile Ala Leu Gly Glu Ala Ile Arg Glu Phe Tyr	355	360	365	370
ttc caa aac aaa acc ata tca gaa aat atg cag aat ttt gta gat gtt				1388
Phe Gln Asn Lys Thr Ile Ser Glu Asn Met Gln Asn Phe Val Asp Val	375	380	385	
tta agt gat aat tgg ttt aca cgt gga att gat gag caa gta aag tta				1436
Leu Ser Asp Asn Trp Phe Thr Arg Gly Ile Asp Glu Gln Val Lys Leu	390	395	400	
act gtt aaa aat cag gaa gaa cca gtt ttt tat tat gtt tat aat ttt				1484
Thr Val Lys Asn Gln Glu Glu Pro Val Phe Tyr Tyr Val Tyr Asn Phe	405	410	415	
gat gaa aat tct cca agt cgg aaa gtt ttt ggt gat ttt gga ata aaa				1532
Asp Glu Asn Ser Pro Ser Arg Lys Val Phe Gly Asp Phe Gly Ile Lys	420	425	430	
ggc ggt ggt cat gct gat gaa ttg ggt aat ata ttt aaa gcc aaa agt				1580
Gly Gly Gly His Ala Asp Glu Leu Gly Asn Ile Phe Lys Ala Lys Ser	435	440	445	450
gca aat ttt ggg aag gaa aca cca aat gct gtg ttg gtt cag aga agg				1628
Ala Asn Phe Gly Lys Glu Thr Pro Asn Ala Val Leu Val Gln Arg Arg				


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455                                460                                465
atg ctg gag atg tgg act aat ttt gct aaa ttt gga aat cct act cca      1676
Met Leu Glu Met Trp Thr Asn Phe Ala Lys Phe Gly Asn Pro Thr Pro
470                                475                                480

gct att acg gat aca ctt cca ata aaa tgg gaa cct gct ttt aaa gaa      1724
Ala Ile Thr Asp Thr Leu Pro Ile Lys Trp Glu Pro Ala Phe Lys Glu
485                                490                                495

aat atg act ttt gtt caa att gac att gat tta aat ttg agt act gat      1772
Asn Met Thr Phe Val Gln Ile Asp Ile Asp Leu Asn Leu Ser Thr Asp
500                                505                                510

cca cta aaa agt cgt atg gaa ttt ggg aat aaa ata aaa tta tta aaa      1820
Pro Leu Lys Ser Arg Met Glu Phe Gly Asn Lys Ile Lys Leu Leu Lys
515                                520                                525                                530

taagtaacta tacttagcta aaccataata taccaaataa tagtatagga atacttcaca      1880

atTTTTtTgtt acttcgttaa gtaaatttaa ttttttataa aaccaacttt tacgaataaa      1940

aaatgtaatt attttggaag aaaaaaagaa aaaaaaaaaa aaaaaaac                1987

<210> 68
<211> 530
<212> PRT
<213> Ctenocephalides felis

<400> 68

Met Cys Asp Pro Leu Leu Lys Thr Thr Thr Tyr Gly Ile Leu Lys Gly
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Lys Lys Val Val Asn Glu Asn Gly Lys Ile Tyr Tyr Ser Tyr Thr Gly
20                                25                                30

Ile Pro Tyr Ala Lys Ser Pro Val Asn Asp Leu Arg Phe Lys Pro Pro
35                                40                                45

Gln Lys Leu Asp Pro Trp Asn Gly Val Phe Asp Ala Thr Gln Tyr Gly
50                                55                                60

Asn Asn Cys Ala Ala Gly Lys Trp Phe Leu Lys Ser Ala Gly Gly Cys
65                                70                                75                                80

Glu Asp Cys Leu Tyr Leu Asn Ile Tyr Val Pro Gln Asn Thr Ser Glu
85                                90                                95

Asn Pro Leu Pro Val Met Phe Trp Ile His Gly Gly Ala Phe Val Val
100                                105                                110

Gly Ser Gly Asn Ser Asp Ile His Gly Pro Asp Tyr Leu Ile Glu Tyr
115                                120                                125

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Leu	Asn	Leu	Glu	Ile	Glu	Asp	Ala	Pro	Gly	Asn	Val	Gly	Leu	Met	Asp
145					150					155					160
Gln	Val	Ala	Ala	Leu	Lys	Trp	Val	Asn	Glu	Asn	Ile	Ala	Thr	Phe	Ser
				165					170					175	
Gly	Asp	Pro	Lys	Asn	Ile	Thr	Ile	Cys	Gly	Ala	Thr	Ala	Gly	Ala	Ala
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Ser	Val	His	Tyr	His	Ile	Leu	Ser	Gln	Leu	Thr	Lys	Gly	Leu	Phe	His
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Thr	Thr	Asn	Asn	Leu	Gln	Glu	Ala	Leu	Asp	Phe	Leu	Lys	Asn	Leu	Pro
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Leu	Leu	Asp	Asp	Phe	Val	Phe	Val	Pro	Ser	Ile	Glu	Lys	Thr	Phe	Pro
		275					280					285			
Glu	Gln	Asp	Ser	Tyr	Leu	Thr	Asp	Leu	Pro	Ile	Pro	Ile	Ile	Asn	Ser
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Gly	Lys	Phe	His	Lys	Val	Pro	Leu	Leu	Thr	Gly	Tyr	Asn	Ser	Ala	Glu
305					310					315					320
Gly	Asn	Leu	Phe	Phe	Met	Tyr	Leu	Lys	Thr	Asp	Pro	Asp	Leu	Leu	Asn
				325					330					335	
Lys	Phe	Glu	Ala	Asp	Phe	Glu	Arg	Phe	Ile	Pro	Thr	Asp	Leu	Glu	Leu
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Pro	Leu	Arg	Ser	Gln	Lys	Ser	Ile	Ala	Leu	Gly	Glu	Ala	Ile	Arg	Glu
		355					360					365			
Phe	Tyr	Phe	Gln	Asn	Lys	Thr	Ile	Ser	Glu	Asn	Met	Gln	Asn	Phe	Val
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Asp Val Leu Ser Asp Asn Trp Phe Thr Arg Gly Ile Asp Glu Gln Val
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420 425 430

Ile Lys Gly Gly Gly His Ala Asp Glu Leu Gly Asn Ile Phe Lys Ala
435 440 445

Lys Ser Ala Asn Phe Gly Lys Glu Thr Pro Asn Ala Val Leu Val Gln
450 455 460

Arg Arg Met Leu Glu Met Trp Thr Asn Phe Ala Lys Phe Gly Asn Pro
465 470 475 480

Thr Pro Ala Ile Thr Asp Thr Leu Pro Ile Lys Trp Glu Pro Ala Phe
485 490 495

Lys Glu Asn Met Thr Phe Val Gln Ile Asp Ile Asp Leu Asn Leu Ser
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Leu Lys
530

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tcaatttgaa caaaagtcac attttcttta aaagcagggt cccattttat tggaagtgt 300
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aatatattac ccaattcatc agcatgacca ccgcctttta ttccaaaatc accaaaaact 480
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attgcttcac ccagtgcaat agatttttgt gatcgcaaag gtaattctaa gtcagttggt	720
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tttcctgaat ttattattgg tattggcaag tcagttaagt acgaatcttg ttctggaaat	900
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ggtaatttgg tatttaacaa tgtttctact ggtaggtttt tcaaaaaatc caaggcttct	1020
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aaaatttctt ttcgatcata aaaaaaatat ttttttataa ataaaactat atatatttaa	1920
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Lys	Lys	Val	Val	Asn	Glu	Asn	Gly	Lys	Ile	Tyr	Tyr	Ser	Tyr	Thr	Gly	
		20					25					30				
ata	ccc	tat	gca	aaa	tct	cct	gta	aat	gat	ctc	aga	ttc	aag	cca	cca	144
Ile	Pro	Tyr	Ala	Lys	Ser	Pro	Val	Asn	Asp	Leu	Arg	Phe	Lys	Pro	Pro	
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caa	aaa	ctt	gat	cct	tgg	aat	ggg	gtt	ttt	gac	gcc	act	cag	tat	gga	192
Gln	Lys	Leu	Asp	Pro	Trp	Asn	Gly	Val	Phe	Asp	Ala	Thr	Gln	Tyr	Gly	
	50					55					60					
aat	aat	tgt	gct	gct	ggg	aaa	tgg	ttt	ttg	aaa	tca	gct	ggg	ggg	tgc	240
Asn	Asn	Cys	Ala	Ala	Gly	Lys	Trp	Phe	Leu	Lys	Ser	Ala	Gly	Gly	Cys	
65					70					75					80	
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Glu	Asp	Cys	Leu	Tyr	Leu	Asn	Ile	Tyr	Val	Pro	Gln	Asn	Thr	Ser	Glu	
				85					90					95		
aat	cct	ttg	cca	gta	atg	ttt	tgg	att	cat	gga	gga	gca	ttt	gtg	gtc	336
Asn	Pro	Leu	Pro	Val	Met	Phe	Trp	Ile	His	Gly	Gly	Ala	Phe	Val	Val	
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Gly	Ser	Gly	Asn	Ser	Asp	Ile	His	Gly	Pro	Asp	Tyr	Leu	Ile	Glu	Tyr	
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Asp	Ile	Ile	Leu	Val	Thr	Ile	Asn	Tyr	Arg	Leu	Gly	Pro	Leu	Gly	Phe	
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Gln	Val	Ala	Ala	Leu	Lys	Trp	Val	Asn	Glu	Asn	Ile	Ala	Thr	Phe	Ser	
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Gly	Asp	Pro	Lys	Asn	Ile	Thr	Ile	Cys	Gly	Ala	Thr	Ala	Gly	Ala	Ala	
			180					185					190			
agt	gta	cat	tat	cac	att	ttg	tca	caa	ctt	acc	aaa	ggg	tta	ttc	cac	624
Ser	Val	His	Tyr	His	Ile	Leu	Ser	Gln	Leu	Thr	Lys	Gly	Leu	Phe	His	
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Lys	Asn	Pro	Val	Lys	Asn	Ala	Leu	Arg	Leu	Cys	Lys	Thr	Leu	Gly	Leu	
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acc	aca	aac	aac	ctt	caa	gaa	gcc	ttg	gat	ttt	ttg	aaa	aac	cta	cca	768
Thr	Thr	Asn	Asn	Leu	Gln	Glu	Ala	Leu	Asp	Phe	Leu	Lys	Asn	Leu	Pro	
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Val	Glu	Thr	Leu	Leu	Asn	Thr	Lys	Leu	Pro	Gln	Glu	Ile	Asp	Gly	Gln	
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Leu	Leu	Asp	Asp	Phe	Val	Phe	Val	Pro	Ser	Ile	Glu	Lys	Thr	Phe	Pro	
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gaa	caa	gat	tcg	tac	tta	act	gac	ttg	cca	ata	cca	ata	ata	aat	tca	912
Glu	Gln	Asp	Ser	Tyr	Leu	Thr	Asp	Leu	Pro	Ile	Pro	Ile	Ile	Asn	Ser	
	290					295					300					
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Gly	Lys	Phe	His	Lys	Val	Pro	Leu	Leu	Thr	Gly	Tyr	Asn	Ser	Ala	Glu	
305					310					315					320	
ggc	aat	cta	ttt	ttc	atg	tac	tta	aaa	aca	gat	cca	gat	tta	tta	aat	1008
Gly	Asn	Leu	Phe	Phe	Met	Tyr	Leu	Lys	Thr	Asp	Pro	Asp	Leu	Leu	Asn	
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aaa	ttt	gaa	gct	gat	ttt	gaa	aga	ttt	ata	cca	act	gac	tta	gaa	tta	1056
Lys	Phe	Glu	Ala	Asp	Phe	Glu	Arg	Phe	Ile	Pro	Thr	Asp	Leu	Glu	Leu	
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cct	ttg	cga	tca	caa	aaa	tct	att	gca	ctg	ggg	gaa	gca	atc	agg	gaa	1104
Pro	Leu	Arg	Ser	Gln	Lys	Ser	Ile	Ala	Leu	Gly	Glu	Ala	Ile	Arg	Glu	
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Phe	Tyr	Phe	Gln	Asn	Lys	Thr	Ile	Ser	Glu	Asn	Met	Gln	Asn	Phe	Val	
	370					375					380					
gat	gtt	tta	agt	gat	aat	tgg	ttt	aca	cgt	gga	att	gat	gag	caa	gta	1200
Asp	Val	Leu	Ser	Asp	Asn	Trp	Phe	Thr	Arg	Gly	Ile	Asp	Glu	Gln	Val	
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Lys	Leu	Thr	Val	Lys	Asn	Gln	Glu	Glu	Pro	Val	Phe	Tyr	Tyr	Val	Tyr	
				405					410					415		
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Asn	Phe	Asp	Glu	Asn	Ser	Pro	Ser	Arg	Lys	Val	Phe	Gly	Asp	Phe	Gly	
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Ile	Lys	Gly	Gly	Gly	His	Ala	Asp	Glu	Leu	Gly	Asn	Ile	Phe	Lys	Ala	
		435					440					445				
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Lys	Ser	Ala	Asn	Phe	Gly	Lys	Glu	Thr	Pro	Asn	Ala	Val	Leu	Val	Gln	
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Arg	Arg	Met	Leu	Glu	Met	Trp	Thr	Asn	Phe	Ala	Lys	Phe	Gly	Asn	Pro	
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Thr	Pro	Ala	Ile	Thr	Asp	Thr	Leu	Pro	Ile	Lys	Trp	Glu	Pro	Ala	Phe	
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Lys	Glu	Asn	Met	Thr	Phe	Val	Gln	Ile	Asp	Ile	Asp	Leu	Asn	Leu	Ser	
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530

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atcaccaaaa actttccgac ttggagaatt ttcatacaaaa ttataaacat aataaaaaac 360
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atccaaggct tcttgaagg tgtttgtggg aaggcctaag gttttgcata gtcgaagtgc 900
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 Phe Gly Pro Asp Tyr Leu Ile Arg Glu Gly Ile Ile Leu Val Thr Ile
 20 25 30
 aac tat aga tta gga gtt ttc ggt ttt cta tca gcg ccg gaa tgg gat 143
 Asn Tyr Arg Leu Gly Val Phe Gly Phe Leu Ser Ala Pro Glu Trp Asp
 35 40 45
 atc cat gga aat atg ggt cta aaa gac cag aga ttg gca cta aaa tgg 191
 Ile His Gly Asn Met Gly Leu Lys Asp Gln Arg Leu Ala Leu Lys Trp
 50 55 60
 gtt tac gac aac atc gaa aag ttt ggt gga gac aga gaa aaa att aca 239
 Val Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Glu Lys Ile Thr
 65 70 75
 att gct gga gaa tct gct gga gca gca agt gtc cat ttt ctg atg atg 287
 Ile Ala Gly Glu Ser Ala Gly Ala Ala Ser Val His Phe Leu Met Met
 80 85 90 95
 gac aac tcg act aga aaa tac tac caa agg gcc att ttg cag agt ggg 335
 Asp Asn Ser Thr Arg Lys Tyr Tyr Gln Arg Ala Ile Leu Gln Ser Gly
 100 105 110
 aca tta cta aat ccg act gct aat caa att caa ctt ctg cat aga ttt 383
 Thr Leu Leu Asn Pro Thr Ala Asn Gln Ile Gln Leu Leu His Arg Phe
 115 120 125
 gaa aaa ctc aaa caa gtg cta aac atc acg caa aaa caa gaa ctc cta 431
 Glu Lys Leu Lys Gln Val Leu Asn Ile Thr Gln Lys Gln Glu Leu Leu
 130 135 140
 aac ctg gat aaa aac cta att tta cga gca gcc tta aac aga gtt cct 479
 Asn Leu Asp Lys Asn Leu Ile Leu Arg Ala Ala Leu Asn Arg Val Pro
 145 150 155
 gat agc aac gac cat gac cga gac aca gta cca gta ttt aat cca gtc 527
 Asp Ser Asn Asp His Asp Arg Asp Thr Val Pro Val Phe Asn Pro Val
 160 165 170 175
 tta gaa tca cca gaa tct cca gat cca ata aca ttt cca tct gcc ttg 575
 Leu Glu Ser Pro Glu Ser Pro Asp Pro Ile Thr Phe Pro Ser Ala Leu
 180 185 190

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Tyr Arg Leu Gly Val Phe Gly Phe Leu Ser Ala Pro Glu Trp Asp Ile
 35 40 45

His Gly Asn Met Gly Leu Lys Asp Gln Arg Leu Ala Leu Lys Trp Val
 50 55 60

Tyr Asp Asn Ile Glu Lys Phe Gly Gly Asp Arg Glu Lys Ile Thr Ile
 65 70 75 80

Ala Gly Glu Ser Ala Gly Ala Ala Ser Val His Phe Leu Met Met Asp
 85 90 95

Asn Ser Thr Arg Lys Tyr Tyr Gln Arg Ala Ile Leu Gln Ser Gly Thr
 100 105 110

Leu Leu Asn Pro Thr Ala Asn Gln Ile Gln Leu Leu His Arg Phe Glu
 115 120 125

Lys Leu Lys Gln Val Leu Asn Ile Thr Gln Lys Gln Glu Leu Leu Asn
 130 135 140

Leu Asp Lys Asn Leu Ile Leu Arg Ala Ala Leu Asn Arg Val Pro Asp
 145 150 155 160

Ser Asn Asp His Asp Arg Asp Thr Val Pro Val Phe Asn Pro Val Leu
 165 170 175

Glu Ser Pro Glu Ser Pro Asp Pro Ile Thr Phe Pro Ser Ala Leu Glu
 180 185 190

Arg Met Arg Asn Gly Glu Phe Pro Asp Val Asp Val Ile Ile Gly Phe
 195 200 205

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47

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gag tat ttt agc tac aca ggt gtg cct tat gct aaa cct cca gtt gga				95
Glu Tyr Phe Ser Tyr Thr Gly Val Pro Tyr Ala Lys Pro Pro Val Gly	20	25	30	
gaa ctt aga ttt aag cct cca cag aaa gct gag cca tgg aat ggt gtt				143
Glu Leu Arg Phe Lys Pro Pro Gln Lys Ala Glu Pro Trp Asn Gly Val	35	40	45	
ttc aac gcc aca tca cat gga aat gtg tgc aaa gct ttg aat ttc ttc				191
Phe Asn Ala Thr Ser His Gly Asn Val Cys Lys Ala Leu Asn Phe Phe	50	55	60	
ttg aaa aaa att gaa gga gac gaa gac tgc ttg ttg gtg aat gtg tac				239
Leu Lys Lys Ile Glu Gly Asp Glu Asp Cys Leu Leu Val Asn Val Tyr	65	70	75	
gca cca aaa aca act tct gac aaa aaa ctt cca gta ttt ttc tgg gtt				287
Ala Pro Lys Thr Thr Ser Asp Lys Lys Leu Pro Val Phe Phe Trp Val	80	85	90	95
cat ggt ggc ggt ttt gtg act gga tcc gga aat tta gaa ttt caa agc				335
His Gly Gly Gly Phe Val Thr Gly Ser Gly Asn Leu Glu Phe Gln Ser	100	105	110	
cca gat tat tta gta aat tat gat gtt att ttt gta act ttc aat tac				383
Pro Asp Tyr Leu Val Asn Tyr Asp Val Ile Phe Val Thr Phe Asn Tyr	115	120	125	
cga ttg gga cca ctc gga ttt ttg aat ttg gag ttg gaa ggt gct cct				431
Arg Leu Gly Pro Leu Gly Phe Leu Asn Leu Glu Leu Glu Gly Ala Pro	130	135	140	
gga aat gta gga tta ttg gat cag gta gca gct ttg aaa tgg acc aaa				479
Gly Asn Val Gly Leu Leu Asp Gln Val Ala Ala Leu Lys Trp Thr Lys	145	150	155	
gaa aat att gag aaa ttt ggt gga gat cca gaa aat att aca att ggt				527
Glu Asn Ile Glu Lys Phe Gly Gly Asp Pro Glu Asn Ile Thr Ile Gly	160	165	170	175
ggt gtt tct gct ggt gga gca agt gtt cat tat ctt tta ttg tca cat				575
Gly Val Ser Ala Gly Gly Ala Ser Val His Tyr Leu Leu Leu Ser His	180	185	190	
aca acc act gga ctt tac aaa agg gca att gct caa agt gga agt gct				623
Thr Thr Thr Gly Leu Tyr Lys Arg Ala Ile Ala Gln Ser Gly Ser Ala	195	200	205	
tta aat cca tgg gcc ttc caa aga cat cca gta aag cgt agt ctt caa				671
Leu Asn Pro Trp Ala Phe Gln Arg His Pro Val Lys Arg Ser Leu Gln	210	215	220	
ctt gct gag ata tta ggt cat ccc aca aac aac act caa gat gct tta				719
Leu Ala Glu Ile Leu Gly His Pro Thr Asn Asn Thr Gln Asp Ala Leu	225	230	235	
gaa ttc tta caa aaa gcc cca gta gac agt ctc ctg aaa aaa atg cca				767
Glu Phe Leu Gln Lys Ala Pro Val Asp Ser Leu Leu Lys Lys Met Pro	240	245	250	255
gct gaa aca gaa ggt gaa ata ata gaa gag ttc gtc ttc gta cca tca				815
Ala Glu Thr Glu Gly Glu Ile Ile Glu Glu Phe Val Phe Val Pro Ser				

260	265	270	
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ttg gcc aga atg aaa tct gga tcc ttt aac aaa gta cct tta tta gtt Leu Ala Arg Met Lys Ser Gly Ser Phe Asn Lys Val Pro Leu Leu Val 290 295 300			911
gga ttc aac agc gca gaa gga ctt ttg tac aaa ttc ttt atg aaa gaa Gly Phe Asn Ser Ala Glu Gly Leu Leu Tyr Lys Phe Phe Met Lys Glu 305 310 315			959
aaa cca gag atg ctg aac caa gct gaa gca gat ttc gaa aga ctc gta Lys Pro Glu Met Leu Asn Gln Ala Glu Ala Asp Phe Glu Arg Leu Val 320 325 330 335			1007
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aat gag cag aaa ttt att gac ttg ata gga gat att tgg ttt act aga Asn Glu Gln Lys Phe Ile Asp Leu Ile Gly Asp Ile Trp Phe Thr Arg 370 375 380			1151
ggc att gac aag cat gtc aag ttg tct gta gaa aaa caa gac gag cca Gly Ile Asp Lys His Val Lys Leu Ser Val Glu Lys Gln Asp Glu Pro 385 390 395			1199
gta tat tat tat gaa tat tct ttc tct gaa agt cat cct gca aaa gga Val Tyr Tyr Tyr Glu Tyr Ser Phe Ser Glu Ser His Pro Ala Lys Gly 400 405 410 415			1247
aca ttt ggt gac cat aac ttg act gga gca tgt cat ggt gaa gaa ctt Thr Phe Gly Asp His Asn Leu Thr Gly Ala Cys His Gly Glu Glu Leu 420 425 430			1295
gtg aat tta ttc aaa gtc gag atg atg aag ctg gaa aaa gat aaa ccg Val Asn Leu Phe Lys Val Glu Met Met Lys Leu Glu Lys Asp Lys Pro 435 440 445			1343
aat gtt tta tta aca aaa gat agg gta ctt gct atg tgg acg aac ttc Asn Val Leu Leu Thr Lys Asp Arg Val Leu Ala Met Trp Thr Asn Phe 450 455 460			1391
atc aaa aat gga aat cct act cct gaa gta act gaa tta ttg cca gtt Ile Lys Asn Gly Asn Pro Thr Pro Glu Val Thr Glu Leu Leu Pro Val 465 470 475			1439
aaa tgg gaa cct gcc aca aaa gac aag ttg aat tat ttg aac att gat g Lys Trp Glu Pro Ala Thr Lys Asp Lys Leu Asn Tyr Leu Asn Ile Asp 480 485 490 495			1488